Revolutionary Secrets:
The Secret Communications of the American Revolution

By Jennifer Wilcox

In the late summer of 1781, General George Washington finally saw an opportunity to take New York City away from the British. Virtually from the beginning of the War for Independence six years earlier, the British held this key city and Washington long desired to take it into American hands. Washington laid siege to the town all summer. With the expected arrival of Admiral de Grasse and ships of the French fleet along with an additional 3,000 French soldiers, he believed he may finally have his chance. But on August 14th, he changed his mind and turned his eye to Yorktown, Virginia.

Intelligence, gained partially through the decryption of captured British messages, gave Washington the assurance he needed to complete his move on Yorktown.

Communication plays an important role in both a country's diplomacy and its wars. Even if that country doesn't yet exist. Keeping those communications secret, or the ability to understand the adversary's communications, can make the crucial difference in a leader's actions and abilities.

At the time of the American Revolution, both the British and the American rebels practiced a variety of methods to keep their written communications secret. Both had networks of spies who needed to pass on their information right under the noses of their adversaries. Both turned to invisible inks, hidden messages, and secret writing in the form of ciphers and codes.

Ciphers and codes, cryptography, change messages into something unintelligible by the use of keys and lists. Ciphers rearrange letters or change individual letters into a different letter, number, or symbol based on a prearranged setting known as a key. Codes change entire words or phrases into other words, number groups, or symbols based on a list or a book. To decrypt the secret messages, the receiver needs access to the original key. Theoretically, the adversary wouldn't have the key and therefore could not understand the message even if it was captured.

Solving a message without having the key, cryptanalysis, has been a science employed by governments for as long as people have been using cryptography to make their messages secret. European governments have a long history of "Black Chambers," the offices where other countries' diplomatic mail was opened and read. If the message was encoded, a Black Chamber tried to solve the code and read the message.

This is the story of revolutionary communications and cryptologic secrets and the role they played in America's war for independence.

The Battles Begin

Even before the first shots at the Battles of Lexington and Concord, Paul Revere had a private code system in place: a visual signaling system. Revere arranged to use two lanterns in Boston's North Church to send a signal. Seeing the lamps across the bay, his compatriots in Charlestown knew that the British regulars were crossing to Charlestown over the Back Bay and sent out riders to warn Sam Adams and John Hancock in Lexington. The signal, understood only by Revere and his friends on the opposite side of the bay, was in place in case Revere would be unable to cross the water himself to give the warning.

Revere's story is now well known through Longfellow's poem, *Paul Revere's Ride*. Most school children can quote the famous lines:

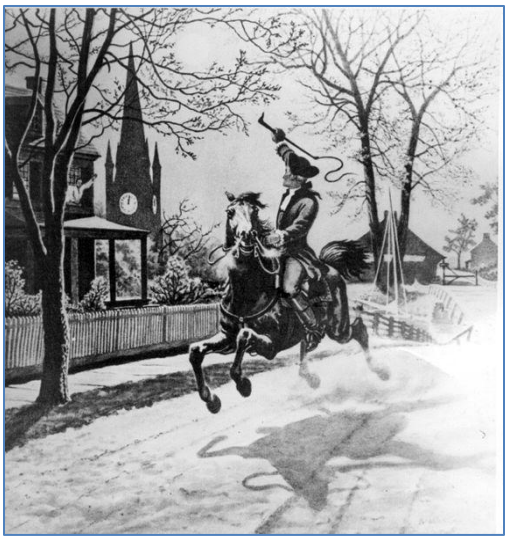

Figure 1: The Midnight Ride of Paul Revere - National Archives

"One if by land, and two if by sea;
And I on the opposite shore will be,
Ready to ride and spread the alarm
Through every Middlesex village and farm" (10-13)[1]

Although the poem is not quite historically accurate, it was the early warnings of the patriotic rebels, initiated by the lantern code, that helped enable a colonial victory at Concord. With knowledge that the British regulars were coming, the colonists pulled their militia forces together and successfully engaged the British at the North Bridge in Concord. They also had time to remove most of their stores from Concord to places safely away. Finally, the forewarning allowed Adams and Hancock to escape capture.

The battles in Lexington and Concord may not have resulted in the success the British had hoped for, but it was only the beginning of a war that they had every reason to believe would end favorably. They had superior numbers, experience, and capabilities. They also had the support and assistance of some loyal inhabitants.

A few weeks after the battle in Concord, a British Loyalist named Benjamin Thompson used invisible ink to send secret information to British headquarters in Boston.

The use of invisible inks is an ancient art and the idea of disappearing writing was not new at the time of the American Revolution. Giovanni Battista Porta included several recipes for secret inks in his works of the late 16th century.[2] The practice of invisible writing was often included in

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[1] Henry Wadsworth Longfellow, *Paul Revere's Ride*. (1860) lines 10-13.
[2] David Kahn, The Codebreakers (New York: Macmillian, 1967) p. 138.

cryptologic skills up to WWII when the technique fell more under the auspices of covert operations than cryptographic methods.

Benjamin Thompson, a native of Woburn, Massachusetts, married a wealthy widow and moved to a farm in New Hampshire as young man. After turning British deserters back over to the British, he was accused of not supporting the American cause. The harassment of his neighbors forced him to return to his home town,[3] just five miles from Lexington.

After the Battles of Lexington and Concord, Thompson learned some of the Patriots' military plans in New England from conversations with well placed Patriots. He never named his sources, though he stated the information came, "from a Field officer in the Rebel Army (if that mass of confusion may be called an Army) & from a member of the Provincial Congress that is now setting at Watertown."[4]

To relay his information, Thompson used a method described by Porta to create an invisible ink: gallotannic acid. The Red Coats used ferrous sulphate to reactivate the ink.[5]

He also used a common technique when writing with "sympathetic stain," as invisible ink was sometimes called. He wrote an ordinary message in plain ink to be read if the message was intercepted by the enemy. The dark ink included nothing suspicious. It was merely a request to deliver some papers and obtain a receipt. Thompson's real message, once revealed, detailed how many men the Colonists hoped to raise and that their first movement would be against Boston. He then revealed that the Colonists would apply to European powers for assistance almost immediately. [6]

What may have seemed odd, and might have given the game away, had anyone other than the British received this message, is that the visible portion in dark ink took barely half a page and yet there were three pages enclosed in the letter.

Loyal to the crown, Thompson left his wife at the outbreak of the war to serve Gen. Gage as a colonel in the Loyalist Army. When the British evacuated Boston, he moved (without his wife and daughter) to London where he became an assistant to Lord George Germain[7], the Secretary of State for the American Department. After the war, his work as a scientist gained prominence. Today, Sir Benjamin Thompson, Count Rumford, is known for his work in thermodynamics as well as other scientific endeavors. Less known is his secret involvement at the opening of the Revolutionary War.

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[3] John Bakeless. *Turncoats, Traitors, and Heroes*. (Philadelphia: Lippincott, 1959) p. 33.
[4] Benjamin Thompson, "Letter to ? 6 May 1775," *Spy Letters of the American Revolution*, in the Sir Henry Clinton Collection of the Clements Library, Univ. of Michigan. ‹http://www2.si.umich.edu/spies/index-gallery.html›
[5] Kahn, p. 180.
[6] Thompson, *Spy Letters.*
[7] Bakeless, p. 36.

Not all of Gen. Gage's spies fared as well as Thompson. Dr. Benjamin Church's fate was less than glorious.

Dr. Church was perhaps Gen. Gage's most highly placed spy amongst the colonists. He was a member of the Sons of Liberty and the Committees of Correspondence and Safety in Boston. He was elected as a delegate to the Massachusetts Provisional Congress and a liaison to the Continental Congress. Washington named him Chief Physician of the Continental Army, effectively the Surgeon-General. And all the while he spied for Gen. Gage.

Church was one of the spies that provided information about the military supplies held in Concord. It was this information that prompted Gage to move his men to Lexington and Concord, which led to the first shots of the war.

However, unlike Benjamin Thompson, when the war began, Church continued to work with the Patriots and shared what he learned with Gage. It was an encrypted letter that brought his downfall.

A Newport, Rhode Island baker, Godfrey Wenwood, was approached by his former mistress in August 1775. She asked Wenwood to help her get in touch with some British officers so she could give them a letter. Suspicious, Wenwood convinced her to leave the letter with him and he would pass it on. Instead, he gave the letter to a friend who opened it to discover cryptic writing of Greek characters, symbols, numbers and letters. Unable to understand it, he gave it back to Wenwood who kept it while trying to decide what to do. When he received a letter from the woman complaining that he hadn't forwarded the letter, Wenwood became even more suspicious. He went up the chain of command and in September 1775 presented the enciphered letter to George Washington.

The mistress was brought before Washington and under interrogation she admitted the letter came from Dr. Church. Washington was stunned by this news as the doctor was a highly valued and trusted man in his army. He called for the doctor to explain the incriminating evidence. Church admitted he'd written the letter, but claimed it was to his brother and of little import. The letter, however, was addressed to Major Cane of the British military. Church refused to decrypt the letter and prove his innocence.

Washington searched for someone to decipher the message. Dr. Samuel West, a pastor and former classmate of Church's, took on the task. Elbridge Gerry, a member of the Massachusetts Provisional Congress (and later the fifth Vice President of the United States,) and Elisha Porter, a colonel in a Massachusetts regiment, as a team, also worked on it. They both came up with the same solution.

The cipher used a simple monoalphabetic substitution. Each letter of the alphabet was replaced by a different letter, number, or character. In this case, for example, Church used the number 9 to represent the letter A, a lower case p replaced E, the Greek letter Theta (Θ) was an R, and the

British symbol £ was a Y.[8] Because the actual, or plain text, letter is always replaced with the same cipher character, the system is fairly easy to solve. Dr. Church may have believed the common misconception that the use of non-alphabetic characters makes a substitution system more difficult to solve. West and Gerry and Porter solved the message in only a day or two. Washington received both decryptions on October 3rd.

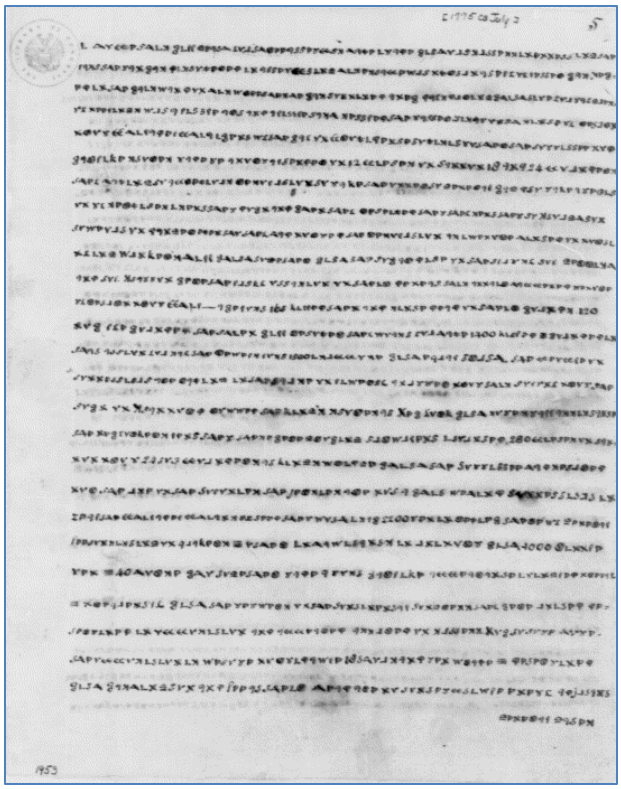

Figure 2: Cipher message from Dr. Benjamin Church - Washington's Papers, Library of Congress

The monoalphabetic cipher revealed that Church was providing Gen. Gage with information on American ammunition supplies, rations, recruiting, a proposed attack on Canada, artillery in Kingsbridge, NY, troop strength in Philadelphia, and the general mood of the Continental Congress.

Presented with this fact, Church now claimed he was trying to show the British the strength of the Americans in order to deter them. He had in fact greatly exaggerated the American's numbers and used this as proof of his motives. Church's words only made the Patriots more thoroughly convinced of his guilt. The implication of the letter also accounted for a few other events that Washington had been unable to explain. For example, Gen. Gage knew congressional secrets and some American actions had been less effective than they should have been. However, the depth of Church's dealings with Gage was not known until the 20th century. Washington only knew of this one encrypted letter and it was enough to seal his fate.

After being jailed, and a prisoner exchanged refused, Church was finally exiled to the West Indies in 1780. The ship he was on sank and Church was never heard from again.[9]

Diplomatic Dispatches

Shortly after Church's deception was discovered, the Second Continental Congress created the Committee of Correspondence on November 29, 1775. It was quickly renamed the Committee of Secret Correspondence. (It was renamed again two years later as the Committee of Foreign

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[8] S. Tomokiyo, "Benjamin Church and the Cipher Letter," *First Codebreaking in the American Revolution*, 2009. ‹http://www.h4.dion.ne.jp/-room4me/america/code/church.htm›

[9] Kahn, p. 175-6.

Affairs.) The committee was to have five members whose sole purpose was to communicate with "our friends in Great Britain and other parts of the world."[10]

The committee employed secret agents abroad, conducted covert operations, funded propaganda, authorized the opening of private mail, acquired foreign publications for analysis, established a courier system, developed a maritime capability separate from the Navy, and created codes and ciphers.

This is the office through which Congress communicated with its delegates overseas. Letters from the representatives went to the committee, which would read them to Congress if necessary. Congress' reply would be written in code, cipher, or invisible ink and sent back to the delegates. This is also the office through which intercepted British communications would be analyzed.[11]

In the spring of 1776, the Committee of Secret Correspondence appointed Silas Deane, a Connecticut delegate to the Continental Congress, as a secret agent in France. He was to pose as a Bermudian merchant selling Indian goods, but he was tasked with making clandestine purchases and gaining secret assistance from the French Crown.

Benjamin Franklin recommended that Deane contact Edward Bancroft near London. Bancroft, born in Westfield, Massachusetts, moved to England in 1766. He had acted as a spy for Franklin while he was in London. Franklin believed, "From him you may obtain a good deal of information of what is now going forward in England, and settle a mode of continuing a correspondence."[12] Apparently he believed Bancroft would again be willing to supply information concerning the British. He instructed Deane to use the cover name "Mr. Griffith" when contacting Bancroft. Since Bancroft had once been a student of Deane's, Franklin suggested Deane ask Bancroft to come to Paris, claiming their previous acquaintance as an excuse for the visit.

After receiving Deane's request for a meeting in Paris, Bancroft met Deane on July 8, 1776. Deane revealed the true purpose of his visit: to acquire French assistance for the United States. He even took Bancroft with him to a meeting with French Foreign Minister Vergennes.

Upon returning to England, a British agent and former American convinced him to meet with British secretaries of state concerning his visit with Deane. By this time, Bancroft had lived in England for ten years and now believed the Colonies should not be separated from Britain. Thus, he was open to the urgings of William Eden, chief of the British intelligence service. Eden

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[10] "The Committee of Secret Correspondence," *Intelligence in the War of Independence*, (Washington, DC: Public Affairs, Central Intelligence Agency, 1997.) p. 9.

[11] "Milestones 1776-1783." *Office of the Historian*. ‹http://www.state.gov/milestones/1776-1783/SecretCommittee›

[12] "Letter from Committee of Secret Correspondence to Silas Deane 2 Mar 1776," *Papers of Benjamin Franklin*, ‹http://franklinpapers.org/franklin/framedVolumes.jsp›

recruited Bancroft to work as a double-agent maintaining his contact with the Americans in France and reporting back to the British.

Silas Deane, and later Benjamin Franklin, gave Bancroft full access to American negotiations with France. They even hired him as their secretary and unknowingly put a spy on the payroll. In this position, Bancroft copied all the instructions sent to the American commissioners from the Continental Congress as well as U.S. correspondence with the French foreign minister. Much of the information Bancroft provided to Britain pertained to military supplies and shipments from France to America and the progress on a French-American treaty.

His method of communication to the British involved invisible ink. He wrote to specific individuals in dark ink using flowery language. Thus, if intercepted, the messages would not arouse suspicion. However, written between the lines in invisible ink was the real message. He took his letters to a dead drop (inside the hollow roots of a tree) where they were retrieved and taken to the British Embassy. Lord Stormont, the British ambassador, had the formula to develop the hidden ink, revealing its secrets.[13]

Even though the American commissioners unknowingly provided valuable details to the British through Bancroft, they did try to keep their official correspondence secret, at least from others outside of their quarters.

Silas Deane, John Adams, and Ben Franklin used invisible ink or ciphers. Deane used an invisible ink made from a compound of cobalt chloride, glycerine and water. The reactivation agent was heat.[14] Franklin and Adams more commonly used ciphers to encrypt their messages.

Charles Dumas developed a very popular cipher used by American representatives. In fact, he created America's first diplomatic cipher.

Dumas, a German born scholar, lived in the Netherlands. While Ben Franklin served as an American representative in London (1757-1775), Dumas struck up a friendship and correspondence with him. At the time of the Revolution, Dumas was in Holland. At Franklin's suggestion, the United States made Dumas an agent. They paid him £100 and gave him secret assignments. He was to report on foreign diplomats in Holland, disseminate propaganda favorable to America, and win Dutch support for American war maneuvers.

Well aware of European Black Chambers' penchant for opening other countries' diplomatic mail, Dumas created his cipher and instructed American diplomats on its use. It was perhaps the easiest and most reliable cipher system used by the Americans at that time.

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[13] John P. Vaillancourt, "Edward Bancroft (@ Edwd. Edwards), Estimable Spy," *Studies in Intelligence*, Vol. 5 No. 1 (Winter, 1961): A53-A67.

[14] "Intelligence Techniques," *Intelligence in the War of Independence*, p. 30.

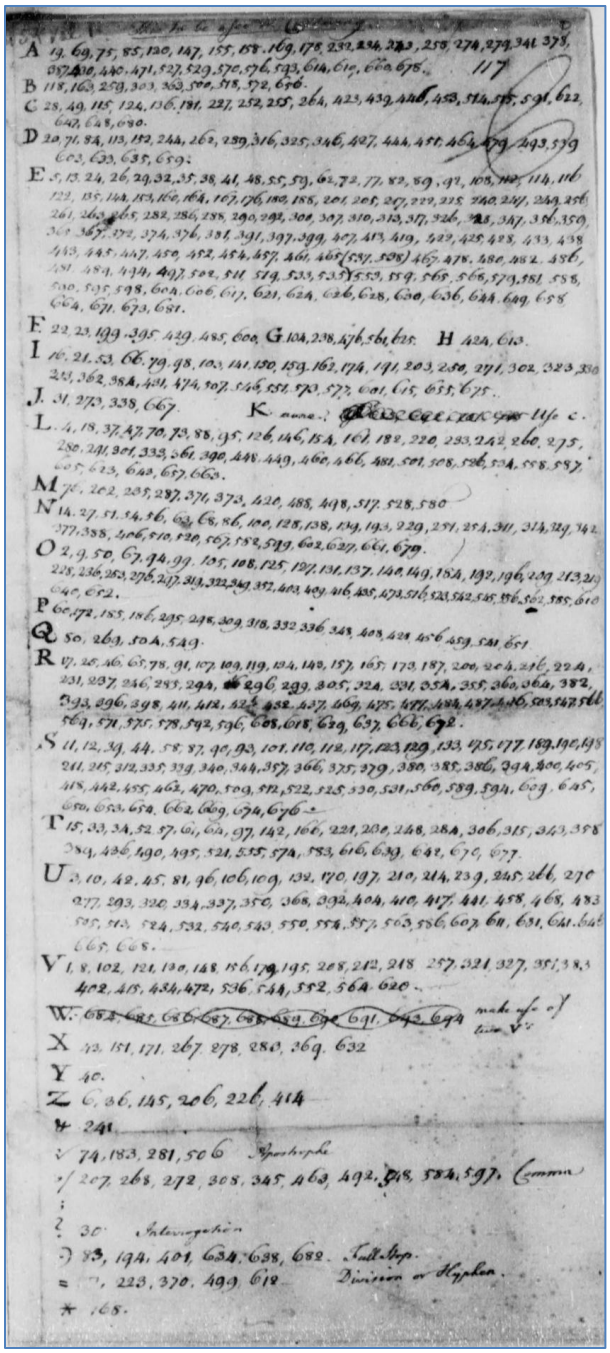

Figure 3: Dumas Cipher - Continental Papers, National Archives

Dumas' cipher used a paragraph of French prose. Each letter and punctuation mark was numbered in a one-up order. He then wrote out a two-part sheet. One page listed each letter and symbol followed by all the possible choices to represent that character. The second page listed each number and its corresponding letter or symbol. The French paragraph was 682 characters long providing several options for the most commonly used letters. The letter E could be replaced by any one of 127 different numbers.

However, the letter W was not in the paragraph. Dumas apparently considered using numbers higher than 682 to represent W, but then changed his mind and decided to use two V's instead. The letter K doesn't appear in the cipher either and it was represented by the letter C.[15]

Unfortunately, this cipher wasn't used in the most secure fashion. People, including Franklin and Dumas, tended to use the first few numbers listed for any one letter rather than a random selection throughout the list. Nonetheless, it was quite simple to use and was popular among the American representatives who used it throughout the war.

Hiding Secrets

Meanwhile, back in the newly declared United States, Gen. George Washington was desperate for information on the British. In August 1776, the Continental Army suffered substantial losses at the Battle of Long Island. Washington knew that if he were to defeat the British, he needed to know the current status of their troops and supplies as well as have foreknowledge of their intentions. He needed a volunteer to enter the British lines and spy. Nathan Hale agreed to go.

[15] Charles W. F. Dumas, "Cipher," *Continental Congress – Papers*, NARA, 2006 ‹http://www.footnote.com/image/#172689›

Unfortunately, Hale was recognized as a rebel and arrested. Incriminating notes were found hidden in his boots and Hale confessed to being a soldier in the Continental Army. He was accused of spying and immediately sentenced without a trial to hang the next morning.

Hale's attempt to hide his notes in his shoes was a feeble attempt at best. The British made far better use of hidden messages. Prior to the Battles of Saratoga, British generals John Burgoyne, Sir William Howe, and Sir Henry Clinton sent messages secreted inside ordinary objects.

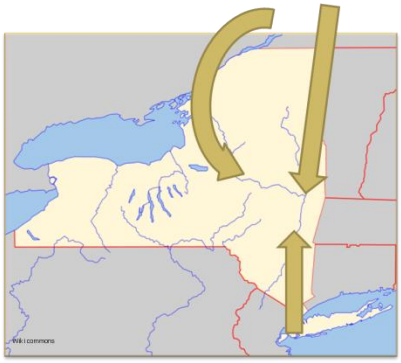

Figure 4: Burgoyne's Plan to capture Albany

Burgoyne's original plan to cripple the Continental forces was to move his troops from Quebec to Albany. A second column would come through the Mohawk Valley while a third British force, under William Howe's command, would come from New York City. When the British controlled the Hudson River valley they would sever New England from the rest of the colonies.

However, this was not to be. Although Burgoyne saw initial success with the capture of Fort Ticonderoga in July, Gen. Howe decided to change the plan.

With Washington's victories in Trenton and Princeton, Howe sought and received permission to take Philadelphia. Howe made Burgoyne aware of his intentions to move to Philadelphia in a message he sent hidden inside a quill. He inserted the long, narrow, messages into a large, hollow quill feather. The note congratulated Howe for his successful taking of Fort Ticonderoga and warned that one of the messengers Burgoyne sent had been captured and the note, hidden inside a double-sided canteen, confiscated.

Figure 5: Howe's message hidden inside a feather quill - Clements Library, Univ. of Michigan

The note hidden in the quill also says:

> "Washington is waiting our motions here, [sic]. - My intention is for Pensilvania where I expect to meet Washington, but if he goes to the Northw.d [sic] you can keep him at Bay, be assured I shall soon be after him to relieve you. [sic] S.r Hen.y Clinton remains in the command here, & will act as occurrences may direct. Putnam is in the Highlands with about 4000 men. - Success be ever with you. Yours. O. WHowe"[16]

[16] William Howe, "Letter to John Burgoyne 17 July 1777," *Spy Letters.*

Distressed that he would not have the support he needed, Burgoyne attempted to change Howe's mind, but to no avail. Even Henry Clinton believed Howe's move unwise. In another secret message to Burgoyne, Clinton expresses his concern. However, his words are cleverly disguised as approval.

> "You will have heard, Dr Sir, I doubt not long before this can have reached you that Sir W Howe is gone from hence. The Rebels imagine that he is gone to the Eastward. By this time however he has filled Chesapeak bay with surprize and terror. Washington marched the greater part of the Rebels to Philadelphia in order to oppose Sir Wm's army. I hear he is now returned upon finding none of our troops landed but am not sure of this, great part of his troops are returned for certain. I am sure this countermarching must be ruin to them. I am left to command here, half of my force may, I am sure, defend everything here with much safety. I shall therefore send Sir W 4 or 5 Bat[tallio]ns. I have too small a force to invade the New England provinces; they are too weak to make any effectual efforts against me and you do not want any diversion in your favour. I can, therefore very well spare him 1500 men. I shall try some thing certainly towards the close of the year, not till then at any rate. It may be of use to inform you that report says all yields to you. I own to you that I think the business will quickly be over now. Sr W's move just at this time has been capital. Washingtons have been the worst he could take in every respect. Sincerely give you much joy on your success and am with great Sincerity your HC."[17]

The actual message, however, is hidden within. It can be revealed through the use of a mask. A sheet of paper with an hourglass shape cut from it could be placed over the full letter allowing only a smaller portion of the writing to be visible. With the mask in place, the message Henry Clinton relays is vastly different than the full letter.

> "Sir W Howe is gone to the Chesapeak bay with the greatest part of the army. I hear he is landed but am not certain. I am left to command here with too small a force to make any effectual diversion in your favour. I shall try something at any rate. It may be of use to you. I own to you I think Sr W's move just at this time the worst he could take. Much joy on your success."[18]

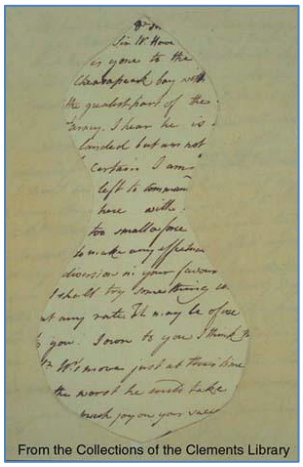

Figure 6: Clinton letter to Burgoyne with mask revealing true message - Clements Library, Univ. of Michigan

These masked messages may have been England's most secure form of written communication since it provided no discernable patterns, however they were difficult to construct. It required two parts: the letter and the mask. The mask is laid over the blank paper

[17] Ibid. "Henry Clinton to Burgoyne 10 Aug 1777."
[18] Ibid.

and the true message is written within the open space. Then the mask is removed and the rest of the letter is composed around the true message. This can be quite difficult since the letter must make sense when read even without the mask. However, if done properly, it can effectively protect secret messages.

Howe's move to Pennsylvania, Clinton's inability to reinforce Burgoyne, and Burgoyne's determination to reach Albany, all played a major role at the Battles of Saratoga in the fall of 1777.

The first confrontation at Saratoga, known as the Battle of Freeman's Farm on September 19, involved American troops from General Benedict Arnold's men and Morgan's sharp shooters. The advantage on the field volleyed back and forth between the Continental Army and Burgoyne's men throughout the afternoon. Although the Americans inflicted significant casualties, at night fall the British held the field.

The commanding American general, Horatio Gates, made a report of the fighting to Congress, but made no mention of Benedict Arnold. Slighted, Arnold argued with Gates. As a result, Gates relieved him of command, but Arnold didn't leave Saratoga.

In the British camp, Burgoyne tried to decide what to do. Should he immediately follow up on his victory at Freeman's Farm or wait? He chose to wait a day and planned to attack again on the 21st. However, that morning, he received a message from Sir Henry Clinton in New York. Based on this message, Burgoyne changed his mind and did not attack Gates.

The letter used the hourglass mask. In place, the message read:

> "You know my good will and are not ignorant of my poverty. If you think 2000 men can assist you effectually, I will make a push at [Fort] Montgomery in about ten days. But ever jealous of my flanks if they make a move in force on either of them I must return to save this important post. I expect reinforcement everyday. Let me know what you wish."[19]

Although not the confident promise Burgoyne would have liked, he found Clinton's message encouraging. He decided to dig in and await reinforcements from New York City. However, as time passed, Burgoyne realized Clinton wasn't coming. His men were on cut rations and fatigued. He needed to act, but retreat was not an option he would consider. He and his generals decided to attack the American left flank again.

British Gen. Clinton made one other last attempt to communicate with Burgoyne. In early October, 1777, his troops were finally on the move to assist Burgoyne. To help ensure the information reached Burgoyne, Clinton sent his message through two different couriers. The

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[19] Richard M. Ketchum, *Saratoga: Turning Point of America's Revolutionary War* (New York: Holt, 1997) p. 375.

message read: "*Nous y voila* [Here we are] and nothing now between us but Gates, I sincerely hope this little success of ours may facilitate your operations."[20]

For one of the couriers, at least, the message was written on a thin strip of silk and enclosed in a silver ball the size of a bullet. Promised a promotion if the message got through, a young British officer, Daniel Taylor, began his journey to Burgoyne. He was captured almost as soon as he began.

Shortly after leaving Clinton's camp, he saw men in red uniforms and presumed they were British. In fact, they were Americans who had recently captured the clothing and hadn't yet dyed them blue. Upon arrest, Taylor demanded the name of their commanding officer. His captors, having been alerted to be watchful for just such a man, replied, "General Clinton." Since Taylor hadn't gone far from Sir Henry Clinton's camp, he assumed it was his own commanding officer to whom they referred.

It wasn't until he was presented to Sir Henry's American cousin, General George Clinton, the governor of New York, that he realized his error. Quickly Taylor swallowed the silver ball and its hidden message. However, his actions were witnessed and a nearby doctor was summoned. Dr. Moses Higby gave Taylor an emetic which caused him to vomit up the silver ball. Taylor quickly grabbed it up and swallowed it again and refused to take another dose of the medicine. George Clinton threatened to hang him and cut the silver ball from him. Faced with that option, Taylor took the emetic.

When the ball was opened, it revealed the note from Henry Clinton. The American Gen. Clinton arrested Taylor and charged him with "lurking about the camp as a spy from the enemy."[21] At his court martial, Taylor tried to convince them that he was merely a messenger, but his argument failed and he was executed.

The other courier did manage to get through to Burgoyne, but it was too late. Clinton's message was written on October 8th. Burgoyne had already made his move.[22]

On October 7th, Second Saratoga, fought at Bemis Heights, began in mid-afternoon.

Benedict Arnold, agitated at being left out of the fight since he'd been relieved of command, charged out of camp and took over Learned's forces. Rallied by Arnold's appearance, his men pushed hard against the British center. Eventually, the Americans succeeded in capturing one of the redoubts exposing the British camp, but not before Arnold was wounded severely. Night fell and the battle ended. During the night, Burgoyne fell back to the fortified positions he'd held in September.

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[20] John Bakeless, *Turncoats, Traitors, and Heroes* (Philadelphia: Lippincott, 1959) p. 151.
[21] George Clinton, *Public Papers of George Clinton* v.2 (Albany: Wynkoop Hallenbeck Crawford, 1900,) p. 443.
[22] Bakeless, p. 151

Without reinforcements coming from New York City or the Mohawk Valley and routed by the Americans, Burgoyne was forced to surrender to General Horatio Gates on October 17, 1777. This was the first major battle won by the Continental Army and a turning point in the war.

Lovell's Keywords

When word of Saratoga's battles reached the diplomats in France on December 4th, the American commissioners immediately sent a letter to the French foreign minister, Vergennes, to announce Burgoyne's surrender. A few days later they sent a second letter requesting the resumption of discussion on a treaty between France and Spain with the United States.[23]

The victory at Saratoga spurred the French to openly join on the side of the Colonists. The American commissioners and the French representative for Vergennes signed the Treaty of Amity and Commerce and the Treaty of Alliance on February 6, 1778.

The United States began seeking additional support from other nations through its European representatives. William Lee, the newly appointed commissioner to Berlin and Vienna, asked Congress for a cipher in which to correspond. James Lovell, a member of the Committee of Foreign Affairs (formerly the Committee of Secret Correspondence,) replied in May 1778. He suggested Lee use the same cipher given to Benjamin Franklin. This would allow him to correspond, not only with Congress, but with other diplomats as well.[24]

James Lovell, the newest member to the Committee of Foreign Affairs, was a pioneer in cryptographic methods. He's considered to be the father of American cryptology.

James Lovell studied at Harvard and taught school in Boston. After the Battle of Bunker Hill in 1775, Lovell was taken prisoner by the British. Released in December 1776 in a prisoner exchange, he was immediately elected to the Continental Congress and shortly thereafter assigned to the Committee of Foreign Affairs. He took his assignment to the committee quite seriously and stayed there for five years as others members came and went. He didn't even take leave to visit his wife and children. Among Lovell's responsibilities with that committee was the writing and deciphering of dispatches.

Aware of the need for cryptographic systems in order to avoid the loss of information through the European Black Chambers, Lovell created ciphers and taught them to the diplomats. He liked systems that could be committed to memory as they provided more security than lengthy code books or lists. Unfortunately, the diplomats were less enamored with Lovell's cipher systems.

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[23] "Letters from the American Commissioners to Vergennes, 4 and 8 Dec 1777," *Papers of Benjamin Franklin* ‹http://franklinpapers.org/franklin/framedVolumes.jsp›

[24] James Lovell, "Letter to William Lee 14 May 1778." *Continental Congress – Papers.* ‹http://www.footnote.com/image/#424755›

Lovell's system used the first few letters of a keyword to create the first letters of the cipher alphabets. Then each row was numbered 1-27 (because the ampersand would also be one of the characters in the alphabets.)

In this example, Jefferson is the keyword. The first three letters are used to start the cipher alphabets.

1	J	E	F
2	K	F	G
3	L	G	H
4	M	H	I
5	N	I	J
6	O	J	K
7	P	K	L
8	Q	L	M
9	R	M	N

10	S	N	0
11	T	O	P
12	U	P	Q
13	V	Q	R
14	W	R	S
15	X	S	T
16	Y	T	U
17	Z	U	V
18	&	V	W

19	A	W	X
20	B	X	Y
21	C	Y	Z
22	D	Z	&
23	E	&	A
24	F	A	B
25	G	B	C
26	H	C	D
27	I	D	E

To spell out a word such as 'FLEET,' the user simply moves through the columns finding each letter and writing down the corresponding number.

F in the first column becomes 24. L in the second column is 8 and so on. This creates the cipher 24.8.27.23.16. It seems a straight-forward method with the usual benefits of a polyalphabetic system. The two Es have different cipher numbers, 27 and 23.

However, it didn't always work as well as it could have. One of the problems came from the way Lovell sent the keyword from which to create the alphabets.

For example, in a message to John Adams, Lovell suggested the keyword this way: "You certainly can recollect the name of that family where you and I spent our last evening together with your lady before we sat out on our journey hither. Make regular alphabets in number equal to the first sixth part of that family name."[25]

In a letter to Robert Livingston, the Secretary of Foreign Affairs, Adams complained: "I know very well the name of the family where I spent the evening with my worthy friend Mr. ___ before

[25] Ralph E. Weber, *United States Diplomatic Codes and Ciphers: 1775-1938*, (Chicago: Precedent, 1979) citing Burnett's *Letters of the Members of the Continental Congress*, vol. VI p. 125.

we set off, and have made my alphabet accordingly; but I am on this occasion, as on all others hitherto, unable to comprehend the sense of the passages in cypher."[26] He goes on to say that he knows he got some of it correct because some words deciphered properly, but others didn't. He even regrets that it isn't working because he thinks the ciphered portions are probably important.[27]

Another diplomat and member of the Continental Congress, Francis Dana, on one occasion found Lovell's message unintelligible because he could not remember "the name of the family in Charlestown, whose nephew rode in company with you from this city to Boston."[28]

Lovell's clue to another man instructed him to use the second and third letters of "the maiden name of the wife of that gentleman from whom I sent you a little money on a lottery score."[29] It's no wonder the diplomats had difficulty with Lovell's system.

There was also the issue of errors caused when transcribing a letter to its corresponding number. Lovell had rules which sometimes caused the sender to use the wrong column. For example, any portion written in plain text reset the starting column for the next cipher portion back to the first column rather than continuing from the last used column. Lovell also suggested that on some occasions, the cipher should move through the columns from right to left rather than the usual left to right. All this confusion caused errors in ciphering.

Despite the confusion and difficulties the diplomats may have had communicating, events continued to move in America after France added its support.

New York's Spy Ring

British General Sir Henry Clinton arrived in Philadelphia in May 1778 to replace Gen. Howe. He had orders to evacuate the city. With the French fleet on its way, Clinton chose to return to New York.

George Washington set up a perimeter around New York, but the harbor and waters still belonged to the British. The French opted to engage the British in the West Indies rather than on the American coast. Although this was helpful to the United States since it pulled the British attention and forces away from New York, it wasn't precisely what the Americans preferred.

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[26] John Adams, "Letter to Robert Livingston 21 Feb 1782," *Continental Congress – Papers* ‹http://www.footnote.com/image/#436097›

[27] Weber, p. 31.

[28] Weber, p. 33 cites this quote in a letter from James Lovell to Francis Dana dated 6 Jan 1781 in the papers of John Adams. This author was unable to verify that letter. A later letter states that Dana could not decipher the letter because "I cannot recollect the person whose family name is alluded to." Francis Dana, "Letter to John Adams 16 Mar 1781." *Founding Families: Digital Editions of the Papers of the Winthrops and the Adamses*, 2007, ‹http://www.masshist.org/publications/apde/portia.php?id=PJA11d175›

[29] Weber, p. 34 citing a letter from Lovell to Gerry 5 June 1781 in the Adams Family Correspondence

Washington wanted New York and to get it he needed information. After the failed espionage attempt by Nathan Hale, Washington knew what he really needed was a resident inside New York. A spy in place in the city who put on the airs of a Loyalist would not stand out and could gather better information. Not only did Washington need such a person, but he needed a transmission route to get the information safely out of New York and into his hands.

In the summer of 1778, Washington ordered Major Benjamin Tallmadge to create a spy network.

Benjamin Tallmadge was born and raised in Suffolk County, NY and attended Yale. He was a college friend of Nathan Hale. Like Hale, he too taught school in Connecticut after graduating. When the war began, Tallmadge joined the Continental Army and participated in several battles with Washington including Long Island, Brandywine, and Monmouth.

Hale's execution as a spy may have been a one reason why Tallmadge agreed to become the head of Washington's secret intelligence service. Hale's attempt had been ill-planned. Tallmadge knew that a coordinated network of well placed spies and couriers all working under specific and clear direction could take the information from the city without throwing suspicion on its members, if well planned and executed.

For his agents, Tallmadge, who took on the code name John Bolton, turned to the neighbors he knew and trusted in Setauket, NY. His first recruit was his childhood friend Abraham Woodhull. Known by the code name Samuel Culper, Woodhull began providing Tallmadge with information from New York City as he made routine trips to the city. Despite being devoted to the cause, Woodhull was not made to be a spy. Ever fearful of being discovered, Woodhull insisted on anonymity and that his messages be instantly destroyed so as not to fall into the wrong hands who then might follow the trail back to him.

Woodhull had reason to be concerned. British were sometimes quartered in his house or in the rooming house in New York where he stayed while in the city. He was stopped on more than one occasion while making the journey between New York City and his Setauket home. Eventually it all became too much for him. He wanted to stay out of the city, but he knew how important the work was to Washington and took pride in being a part of it. He found a man to fill his place in New York while he remained in Setauket with only an occasional trip to the city.

Robert Townsend, Woodhull's replacement, couldn't have been a better choice. However, he too was very concerned about his safety should his identity be discovered. He was so concerned that even Washington only knew him by his code name, Culper Jr. Handwriting analysis and comparison of activities and places by the author Morton Pennypacker in the 1920s finally revealed that Culper Jr was Robert Townsend.

Townsend resided in the city. He owned a dry goods store and was a silent partner in a coffee house frequented by British soldiers. He gave every appearance of being a devoted Loyalist but was secretly a Patriot.

Austin Roe was the spy ring's primary courier. As a tavern owner in Setauket, he had reason to travel the 55 miles between New York City and Setauket in order to pick up supplies for his business. He carried the information Culper Jr collected back to Woodhull on his farm. He also provided any additional information he may have gained in his travels. In written communications, Roe had the code number 724.

Tallmadge was stationed in Connecticut across Long Island Sound from his spies in New York. Caleb Brewster carried Tallmadge's instructions or the Culpers' information across the Sound. Brewster, too, was from Setauket and a childhood friend of Tallmadge, but he hadn't been recruited. In fact, he offered his services to Washington even before the Culper Spy Ring began.

Lt. Brewster had been a whaleboatman but now served in the Continental Army. In his free time he took whaleboats and crossed the Sound to harass the British on the opposite shore. He offered to provide Washington with British naval movements, troop numbers, the status of their provisions, and any signs of embarkation. Washington was happy to have the information. Brewster was the clear choice to carry the Culpers' information across the Sound.

Although Brewster was given the code number 725, he never used it himself. Brash and confident, he flaunted his actions and boldly signed his letters with his full name. The British knew of his evening crossings and raids, but were not able to catch him.

A few others were occasional members of the spy ring. Early on, Jonas Hawkins acted as another courier between Setauket and the city. Amos Underhill, Woodhull's brother-in-law, ran a boarding house in New York City. He provided rooms for Woodhull while he was in the city. British soldiers also rented his rooms allowing Amos to pick up a few bits of information that were passed on to Woodhull.

Anna Strong, known as Nancy, also assisted on occasion. Nancy lived on a farm on Long Island Sound within sight of Woodhull's farm. On one of Woodhull's trips to New York, she posed as his wife. Couples were less suspicious than men traveling alone. She is also reported to have used a unique visual signaling system to connect the courier with Brewster who would carry the dispatches across the Sound. Nancy hung a black petticoat on her clothesline to indicate that the sailor was in place. Then she'd hang between one and six handkerchiefs to indicate which of six possible coves he was waiting. Though the line was well within sight of anyone who wished to look, the code meant nothing to the British.

Brewster took requests from Washington or Tallmadge to Woodhull on Long Island who passed the request on to Austin Roe for delivery. The message itself might appear to be a shopping list which may have included a request for a half ream of paper. Roe made the 55 mile trek into town. He could usually find Robert Townsend either in his dry goods store or the nearby coffee house.

Townsend was the silent partner in the coffee shop with the printer, James Rivington. Rivington was the official printer for the King in New York, but he was also a spy for George

Washington. In his Tory newspaper he reported in great exaggerated detail the losses of the Americans while he glossed over any British failures. His apparent dedication to the Crown allowed him access to British military information.

Townsend, code named Culper Jr, was known to write articles for the King's newspaper *Rivington's Royal Gazette*. Those British soldiers who had their names and military activities written up in British papers seemed to be promoted more quickly, so officers were eager to share their stories with Townsend, an apparent Loyalist. They would discuss their exploits in a coffee house conveniently located near Rivington's press and Townsend's store.

When Roe found Townsend, he passed on Tallmadge's request for supplies. At his first opportunity, Townsend took the list to his private quarters and used a reactivation agent on the note causing the real instructions to appear from the invisible ink.

The ink used by the spy ring, as well as others under Gen. Washington's command, was a concoction developed by Dr. James Jay.

James Jay, a physician born in New York, moved to England in 1762 but remained loyal to his homeland. While in England, before the outbreak of the war, Jay realized a secret form of communication was needed. After much experimentation he came upon a successful solution. It was a two part solution, one chemical acted as the ink and another was required to make it visible.[30]

In an 1806 letter to Thomas Jefferson, Jay claims, "By means of this mode of conveying intelligence, I transmitted to America the first authentic account which Congress received of the determination of the British Ministry to reduce the Colonies to unconditional submission…"[31] He sent the message by writing a few friendly sentences in black ink to his brother John Jay, a member of the Continental Congress. In the blank space he used his invisible ink to convey his secret message. He had previously sent his brother quantities of the ink and the reactivation agent, some of which was passed on to Gen. Washington.

George Washington particularly liked Jay's invisible ink and directed his spies to make use of it. In a letter to Benjamin Tallmadge, he wrote: "I send twenty guineas and two fials containing the stain and counterpart of the stain for C__ Jr. which I wish may be got to him with as much safety and dispatch as will conveniently admit of."[32]

Washington also believed information should be transmitted, as Jay recommended, hidden between the lines of an innocent letter. The "shopping list" used this method. However, Townsend preferred to respond using blank paper. He then hid the stained page within a ream

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[30] "Intelligence Techniques," *Intelligence in the War of Independence*, p. 30.
[31] James Jay, "Letter to Thomas Jefferson 14 Apr 1806," *The Thomas Jefferson Papers at the Library of Congress*. ‹http://memory.loc.gov/master/mss/mtj/mtj1/035/1000/1031.jpg›
[32] George Washington, "Letter to Benjamin Tallmadge 5 Feb 1780," *George Washington Papers at the Library of Congress*, ‹http://memory.loc.gov/mss/mgw/mgw4/064/0200/0226.jpg›

of paper at a specific location within the stack. This method allowed Roe to return to Setauket with the papers as part of his supplies.

Riding the 55 miles back, Roe stopped at Woodhull's farm. If Woodhull (Culper Sr) was not available, he left the messages in a box in the field to be retrieved. Culper Sr then included his own comments and information separately in black ink and partially in a code which Tallmadge created in 1779.

Codes replace words with other words, numbers, or even symbols. A wide variety of codes exist, but Tallmadge's was a simple replacement of one number for one word. Unlike Lovell's keyword ciphers, the recipient cannot recreate the code list. He must have an identical copy.

Tallmadge's code list consisted of more than 763 terms and names. Like several other codes, it was based on the *Entick's Spelling Dictionary*, but he selected the words to be included. It was a one-part code being both alphabetic and numeric in order. "A" was number 1 and "Zeal" was 710. At the end he added additional numbers for people, place names, and dates.[33]

Culper Jr. (Townsend) made good use of the system. For example, the last two sentences from a coded message of August 1779 to George Washington reads, "The Renown and Daphne Eli 625 only 592.431.680.282 Rqlv – In 379 pizv 683.281 possible acxi 707.1.526 Eggqwpv 431.625 situation 431.625.655 – Yours 723" This decodes to say, "The *Renown* and *Daphne Eli* [are] the only ships of war in port. In my next will if possible give you a particular account of the situation of the troops. Yours Culper Junior."[34]

Culper Sr also used the code, but with less effect. Most of his letters were written in plain text with only a few code numbers included. A typical letter from Woodhull begins as this November, 1780 message does:

"729 427 ef 1780.

Dear Sir,

Your favour of the k instant is received and observe the contents. In answer to your first question, I again informe you that I was at 727 about the 20 of last month. I then with the advise of C__ Junr and others transmitted you the most accurate account of the embarkation of Gen Mathews."[35]

The code simply states that Culper Sr was writing from Setauket (729) on November (427) 12th (ef). He says he received Tallmadge's letter of the 5th (k) and that he was at New York City (727) about the 20th of last month. The majority of the message is in plain text.

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[33] Benjamin Tallmadge, "Talmadge, 1783, Codes," *Washington Papers* ‹http://memory.loc.gov/mss/mgw/mgw4/094/0000/0022.jpg›

[34] Samuel Culper Jr., "Letter to John Bolton 6 Aug 1779," *Washington Papers* ‹http://memory.loc.gov/mss/mgw/mgw4/060/0800/0873.jpg›

[35] Samuel Culper, "Letter to John Bolton 12 Nov 1780," *Washington Papers* ‹http://memory.loc.gov/mss/mgw/mgw4/072/0700/0704.jpg›

Having added his information to that of Townsend's, Woodhull delivered the missives to Brewster who took them across the Sound to be carried to Tallmadge and on to Gen. Washington.

This very circuitous route, from Connecticut, across the Sound, to Setauket, to New York City and back again, only then to be forwarded to George Washington, though successful, frequently took too long. Washington complained that the information was quite valuable, but by the time he received it, it wasn't as useful as it could have been. In a letter to Tallmadge, Washington implores,

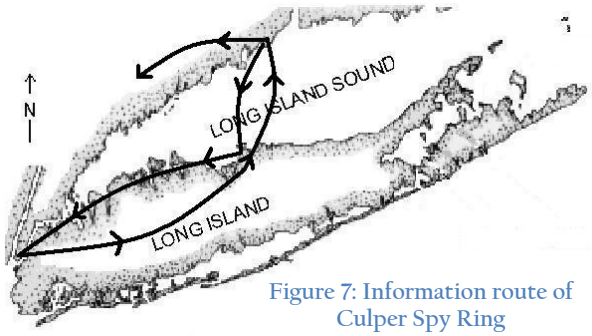

Figure 7: Information route of Culper Spy Ring

> "It is my further most earnest wish, that you would press him [Culper Jr] to open, if possible, a communication with me by a more direct route than the present. His accounts are intelligent, clear, and satisfactory, consequently would be valuable, but owing to the circuitous route through which they are transmitted I can derive no immediate or important advantage of from them, and (as I rely upon his intelligence) the only satisfaction I derive from it, is, that other accts are either confirmed or corrected by his, after they have been some time received."[36]

This situation was a constant complaint of Washington's, but it was never resolved to anyone's satisfaction. Woodhull refused to communicate with anyone he couldn't personally vouch for. On one occasion Townsend used his teenage cousin, James Townsend, as a courier taking a shorter more direct route. It ended poorly.

James stayed the night at the home of John Deausenberry, which was in a heavily Loyalist area. The young man, eager to appear a loyal Tory so that no one suspected him of actually carrying secret messages for Washington, overplayed his hand. He enthusiastically boasted that he had recruited many men for the British army, made several trips carrying provisions for the British, and that he'd even been captured by the rebels once. Deausenberry, a secret Whig, took him prisoner and dragged him to Patriot headquarters. James was frisked and found to be carrying only a poem entitled, "The Lady's Dress." RobertTownsend wrote the poem and used invisible ink between the lines to relay his true information. Washington recognized the poem for what it was: a secret message. Unfortunately, Townsend had done such a poor job of using the ink that Washington was unable to read the message when he applied the reactivation agent. It took Washington's intervention to release the young spy and it was only good fortune that James had fallen into Washington's hands rather than the British. When Woodhull learned of the event, he was insulted that his services were no longer valued. However, the incident actually showed that the circuitous route should be maintained.

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[36] George Washington, "Letter to Benjamin Tallmadge 5 Feb 1780," *Washington Papers* ‹http://memory.loc.gov/mss/mgw/mgw4/064/022/0226.jpg›

Culper Information Aids Washington

Most of the information Culpers Sr and Jr provided concerned the number of British troops, ships, and provisions in New York City as well as the general spirits of the Regulars and Tories. However, on one occasion, the Culpers warned Washington about a man working with Washington, who was in fact loyal to the mayor of New York City and therefore should not be trusted. "Mr C Junr informed me at our intervene that Christopher Dyeink [Duychenik]… of 10 [New York]…is amongst you and is positively an agent for David Mathews Mayor of 10 under the direction of Tyron [Major-general in British Army and governor of the Province of New York.]"[37]

Washington on several occasions spoke highly of the intelligence the Culpers provided him. Despite Woodhull's frequent apologies for his lack of eloquence and his occasional personal comments and opinions of the situation, Washington found the Culper information accurate and complete if not always timely.

Possibly the most valuable information Townsend sent was in July 1780. Washington, knowing the French fleet was about to arrive in Newport, Rhode Island, asked for any information concerning the British activities in New York City and Long Island. Within days of the request, the message went from Tallmadge to Caleb Brewster who took it across Long Island Sound to Austin Roe. Roe rode virtually non-stop to New York City and waited while Townsend gathered the information.

Townsend learned that the British had gathered 8,000 troops and sailed to the north side of Long Island. British General Henry Clinton planned to attack the French before they became entrenched.

Clinton knew of the imminent arrival of the French through his own source, Benedict Arnold.[38] In a letter to his superiors in England, Clinton wrote, "Immediately on my arrival from the southward I received, from such authority [Arnold] as I should have risked an action upon, that the French fleet and 6,000 troops were expected at Rhode Island."[39] Benedict Arnold, a trusted major general in the Continental Army, received his information directly from Washington's headquarters. It was not the first correspondence between Arnold and Clinton, nor would it be the last, but it did inspire Clinton to make a move against the French fleet. He began his preparations to move men out of New York City. It was these actions that Townsend reported back to Washington.

However, Culper Jr's usual means of writing with invisible ink on a specific piece of paper in a stack and carrying the stack back with other goods would have delayed the response by a day.

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[37] Samuel Culper, "Letter to Benjamin Tallmadge 15 July 1779," *Washington Papers* ‹http://memory.loc.gov/mss/mgw/mgw4/060/100/0178.jpg›

[38] Carl Van Doren, *Secret History of the American Revolution*, (New York: Viking, 1941) p. 362 quotes British chief justice Smith as saying Clinton told him he'd learned about the fleet from Arnold.

[39] Ibid p. 271 citing B. F. Steven's *Facsimile of the European Archives* p.730.

Townsend decided instead to write a short message to a known Tory saying that the goods he'd requested were not currently available.[40] This would explain why Roe returned without supplies should he be stopped along the way. The real information was written in the sympathetic stain on that letter. That same day Austin Roe rode the 55 miles back to Setauket and delivered the letter to Woodhull.

Woodhull's accompanying letter to Caleb Brewster emphasized the importance of Townsend's information. "The enclosed requires your immediate departure this day. By all means let not an hour pass: for this day must not be lost. You have news of the greatest consequence perhaps that ever happened to your country."[41]

Townsend's information is lost, but Woodhull also included information he learned from Austin Roe. He addressed this letter to Tallmadge. He reports the types of ships in Admiral Graves' fleet and that they have sailed for the island. Culper Sr. also says that 8000 troops are embarking for the port.[42]

Caleb took Townsend's and Woodhull's letters back across the Sound. Because he didn't know the current location of Major Tallmadge, Brewster gave the information to a dispatch rider to deliver them directly to headquarters. Another copy made its way to Tallmadge. At Washington's headquarters, Alexander Hamilton received the messages the afternoon on the following day. (Washington was not at headquarters at the time.) The entire procedure from Washington's initial request to Hamilton's receipt took ten days.

Hamilton, who was acquainted with the Culpers' methods, used the reactivation agent and read the letter. He forwarded the news to the Marquis de Lafayette who was on his way to Newport to meet the French fleet. When Tallmadge received the information, he immediately sent it on to Gen. Washington.

With this new information, Gen. Washington debated what he could do. Author Morton Pennypacker says that Washington spent the night creating a top secret attack plan for New York City. It said he planned to attack with every available soldier in the middle states. Just such an attack was Gen. Clinton's greatest fear.

Pennypacker claims that a man "who none could suspect" delivered a package to the British outpost claiming that he'd found the package by the side of the road. Some speculate that the man, who appeared to be a Loyalist, was in fact a Patriot and delivered the package at Washington's bidding. Inside, the British found Washington's plan for an imminent attack on New York City. Clinton makes no reference to this package in his report however. "Many causes conspired to retard the arrival of transports at Frog's-neck, from which place my

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[40] Samuel Culper, "Letter to Richard Floyd 20 July 1780," *Washington Papers* ‹http://memory.loc.gov/mss/mgw/mgw4/068/0400/0422.jpg›
[41] Samuel Culper, "Letter to Caleb Brewster 20 July 1780," *Washington Papers* ‹http://memory.loc.gov/mss/mgw/mgw4/068/0400/0421.jpg›
[42] Ibid. ‹http://memory.loc.gov/mss/mgw/mgw4/068/0400/0419.jpg›

embarkation was only effected the 27th. During this time all hopes of success from a *coup de main* were of course wafted away."[43]

Washington knew he needed to keep Clinton from getting to Newport and the French fleet. He also knew, as did Clinton, that the reduction of forces left behind in New York left the city vulnerable. Though Washington wanted to take the opportunity to attack, he knew his troops were too few to succeed. However, in order to protect Rochambeau's arrival, Washington needed only to stop Clinton's movement to Rhode Island.

Whether Washington created fictional attack plans to bolster his deception or if he made his move without them, he did move his troops toward New York in a feint to draw Clinton's attention. "During this time," Clinton reported, "Washington, by a rapid movement, had, with an army increased to 12,000 men, passed the North-river, and was moving towards King's-bridge, when he must have learned that my armament had not proceeded to Rhode-Island. He (I apprehend in consequence of this) re-crossed the river, and is now near Orange Town."[44]

Washington's ruse worked. Clinton called back his troops to protect New York City from an attack that would never come. And thus Rochambeau and the French fleet's arrival in Newport went unchallenged. Washington then began to make plans to join forces with the French for a real attack on New York City.

Benedict Arnold's Treason

As Townsend and Woodhull were hurrying to gather the information Washington requested, Benedict Arnold was plotting to sell West Point to the British. For more than a year Arnold had been providing the British with information.

Arnold spent the winter of 1777-78 recovering from the terrible wounds he suffered at Saratoga. That summer, Washington gave him command of Philadelphia after the British evacuated.

Arnold joined the active social scene in Philadelphia where he met a young woman, Margaret "Peggy" Shippen, the daughter of a prominent Loyalist family. A beautiful young woman, she and her sisters had previously caught the attention of British officers while they were stationed in the town. Among those men was John Andre, adjunct-general in the British Army and chief of its intelligence service. When he left Philadelphia with the British troops, Peggy managed to maintain communications with him.

Despite the 20 year age difference, Arnold sought and eventually won Peggy's hand. It was not long after Benedict Arnold married Peggy Shippen in April 1779 that he began a secret correspondence through John Andre to the British general Sir Henry Clinton.

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[43] Morton Pennypacker, *General Washington's Spies on Long Island and in New York*. Brooklyn, (NY: Long Island Historical Society, 1939,) p. 87 uses an uncited report from Clinton to Lord Germain. See also Alexander Rose who cites B. F. Steven's *Facsimile*, vol. 7 no. 730 as having a similar letter addressed to William Eden, chief of British intelligence.
[44] Ibid.

Arnold communicated with the British using both book codes and ciphers in addition to invisible ink.

Book codes and ciphers (sometimes called "dictionary codes") were quite common at the time of the Revolution. They can provide excellent security if the sender and the receiver each have access to the same edition of the book and the book contains many of the necessary words. This generally requires lengthy volumes on a subject similar to the topic to be encoded. Ideally, the most commonly used words could be found repeatedly throughout the book allowing several choices to encode the same word. Book codes, however, are a bit cumbersome. Locating the required words within the text can be time consuming when attempting to encode a word, assuming the word is used in the book at all. Arnold's book of choice was a legal tome: Blackstone's *Commentaries on the Laws of England*.

Although the actual process varies, Arnold used a standard encoding procedure using a three-number code group to replace a word. The numbers represent the page, line, and word count in that line. 43.23.6 indicates the sixth word on the twenty-third line of page 43.

However, Blackstone's law book contained few of the words Arnold needed to relay military information and much of his message was tediously ciphered. To use a book as a cipher tool, individual letters spelling out a word are located throughout the book. The code group represents the page, line, and letter count. To indicate a letter instead of a word, the final number has a line drawn through it. 43.23.~~12~~ indicates the twelfth letter on the twenty-third line of page 43. This book cipher proved so tedious, Arnold and Andre quickly began using *Nathan Bailey's Dictionary.*

Dictionaries contain the all necessary words. However, each word is listed only once and therefore frequently used words will have the same code group appearing repeatedly in messages. Also, they are in alphabetic order. This makes the words easy to locate, but it also gives an adversary an advantage at guessing a word. The code 6.1.14 indicates a page early in the dictionary and therefore the word begins with a letter at the beginning of the alphabet. The use of a dictionary over a book becomes obvious in a coded message as well. Instead of counting down the lines, the second number indicates the column. Thus 6.1.14 represents the fourteenth word listed in the first column on page 6. When the middle number is always either 1 or 2, a dictionary code is in use.

In a July 15, 1780 coded message Benedict Arnold proposes the sale of West Point using a dictionary code. (The middle number of the code group is always an 8 or 9 because Arnold added seven to each of the numbers.)

West Point was an important fortification on the banks of the Hudson River, not only for its strategic location, but also for its supplies. (The U.S. Military Academy there wouldn't be officially established until 1802.) Arnold knew it would be a valuable asset to the British. If he had command of the garrison, he could turn it over to the British…for a price.

Decoded, Arnold's message reads,

> "Inclosed in a cover addressed to M. Anderson [Andre] Two days since I received a letter *without* date or Signature, inform*ing me that* S. Henry ------ *was* obliged *to me for the* intelligence communicated, *and that he* placed *a* full confidence *in the* Sincerity *of my* intentions, *etc. etc. etc. On the* 13th Instant *I* addressed *a* letter *to you expressing my* Sentiments *and* expectations, *viz, that the* follow*ing* Preliminaries *be* settl*ed* previous *to* cooperat*ing. - First, that S.* Henry secure to *me my* property, valued *at* ten thousand pounds Sterling, *to be* paid *to me or my* Heirs *in case of* Loss; *and, as soon as that* shall happen, ---- hundred pounds per annum *to be* secured *to me for* life, *in* lieu *of the* pay *and* emoluments *I* give *up, for my* Services *as they shall* deserve *- If I* point out *a* plan *of* cooperation *by which S.* Henry shall possess himself *of* West Point, *the* Garrison, *etc. etc. etc.* twenty thousand pounds Sterling *I think will be a cheap purchase for an* object *of so* much importance. *At the same time I* request thousand pounds *to be* paid *my* Agent *- I* expect a full *and* explicit answer *- The* 20th *I* set *off* for West Point. *A* personal interview *with an* officer *that you can* confide *in is* absolutely necessary *to* plan matters. In the mean time *I* shall communicate *to* our mutual Friend *S*_____*y* [Stansbury, the courier] all *the* intelligence *in my* power, until *I have the pleasure of* your answer.
>
> Moore [Arnold]
> July 15th [1780]
>
> *To the* line *of my* letter *of the* 13th *I did not add* seven."[45]

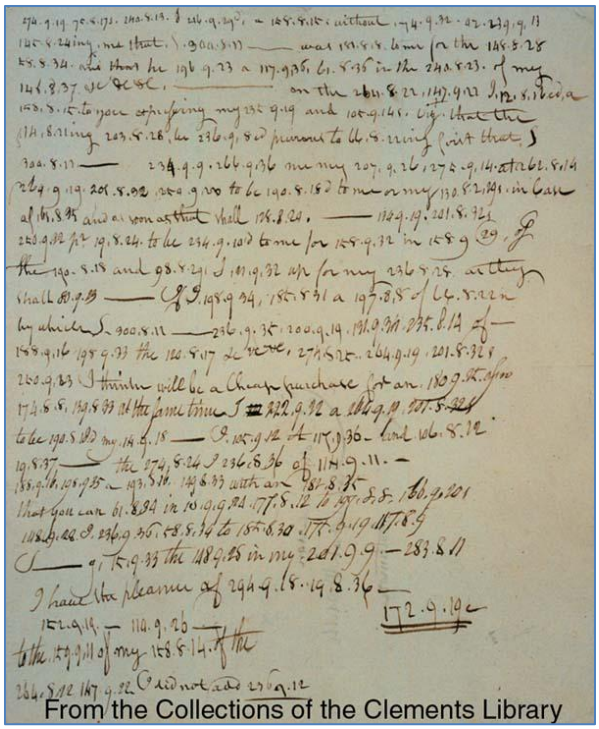

Figure 8: Dictionary coded message from Benedict Arnold proposing the sale of West Point - Clements Library, Univ. of Michigan

Clinton responded with a message agreeing that the post with 3000 men, artillery and supplies was worth £20,000.[46] He didn't, however, agree to compensate Arnold with an additional £10,000 regardless of how events may turn out.

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[45] Benedict Arnold, "Letter to John Andre 15 July 1780," *Spy Letters* ‹http://www2.si.umich.edu/spies/index-gallery.html› Italics added by the author to indicate portions written in plain text.

Arnold did not always use the dictionary code. His August 30th reply to Clinton is disguised as business correspondence. He writes signing the name Gustavus and refers to himself as Mr. Moore. He opens by saying he received Clinton's message and expects to reply in full at a later date.

> "… and to procure you an interview with Mr M__e [Moore] when you will be able to settle your commercial plan I hope agreeable to all parties. Mr M__e assures me that he is still of opinion that his first proposal is by no means unreasonable and makes no doubt when he has a conference with you that you will close with it. He expects when you meet that you will be fully authorised from your house: that the risques, and profit of the co-partnership may be fully and clearly understood.
>
> "A speculation might at this time be easily made to some advantage with ready money, but there is not the quantity of goods at market which your partner seems to suppose, and the number of speculators below I think will be against your making an immediate purchase. I apprehend goods will be in greater plenty and much cheaper in the course of the season; both dry & wet are much wanted and in demand at this juncture, some quantities are expected in this part of the Country soon.
>
> "Mr M__e flatters himself that in the course of ten days he will have the pleasure of seeing you. …"[47]

Andre and Clinton would have understood the true meaning of Arnold's message. Arnold still believes that his original request for £10,000 is reasonable. In the second paragraph he warns that West Point doesn't have the number of men Clinton seems to believe and with the Americans (speculators) nearby, now would not be a good time to move. He expects things to improve shortly and hopes to have their face-to-face meeting within ten days.[48]

This particular message was given to an innocent courier who had no knowledge of its contents or purpose. However, he was suspicious of the circumstances in which Arnold gave him the letter to carry. Rather than follow Arnold's delivery instructions, the courier passed the message to General Parsons of the Continental Army. As Arnold had hoped, should it be intercepted, Parsons believed it was merely a commercial correspondence and thought little of it. He didn't turn it over to Washington until Arnold's treachery was known.

Why Benedict Arnold chose to betray his country has long been debated. His desire for recognition and his need for money most likely played a role. The lifestyle he maintained with

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[46] £20,000 converts to more than $31,000. Using a conversion website, £20,000 from 1780 would be worth more than £2,130,000 today which equates to more than $3,375,000. ‹http://www.measuringworth.com/calculators/ppoweruk/› and ‹http://coinmill.com/GBP_USD.html›

[47] Benedict Arnold, "Letter to 'John Anderson' (John L. Andre) 30 Aug 1780," *Washington Papers*, ‹http://memory.loc.gov/mss/mgw/mgw4/070/0100/0184.jpg›

[48] Van Doren, p. 298.

his young wife was well outside his means, causing him to go into debt. Also, in April 1780, he faced a court martial on eight charges for actions committed while in command of Philadelphia. Although he was convicted of only two minor offenses, this, combined with his previous perceived slights, undoubtedly further angered him. (Not only had Gates failed to mention Arnold in his report on Saratoga, but Congress also passed over Arnold while promoting junior officers in 1777.) In April, amidst the court martial, Arnold resigned as military governor of Philadelphia. Shortly thereafter, following up on Washington's promise of a prominent position, he requested command of West Point.

August 3, 1780, Washington granted Arnold's request never knowing Arnold was already conspiring to give up the stronghold to the British.

To make the arrangements for its sale and capture, Gen. Clinton sent John Andre to meet with Arnold. The two had long been connected through the secret correspondence chain. Since Arnold wasn't certain how Andre would arrive, he sent a note to Major Tallmadge and other surrounding commanders stationed closer to the British line requesting passage and escort for Mr. John Anderson (the code name Arnold used for Andre) if he should happen to come that way.

Finally, Arnold had word that Andre was aboard the *HMS Vulture*, a British ship on the Hudson, awaiting transport to Arnold. The two met across the river. Though no one knows exactly what was discussed, they spoke until almost dawn on September 22. Arnold also passed papers concerning West Point's fortifications and other details to Andre insisting that he hide them in his stockings.

With the day about to break, Andre was forced to stay ashore and Arnold led him back to a sympathizer's house belonging to Joshua Smith. The house was behind American lines.

Arnold's original plan called for Andre to travel by land in disguise as a civilian. This would put Andre at great risk if caught and Andre originally refused. To be caught behind American lines in disguise proved him to be a spy, which meant a death sentence. However, the *Vulture* had been attacked while he was ashore and Andre's return plan had to change. Arnold wrote passes for John Anderson and Joshua Smith to present if they were stopped by the American posts along a land route. He then returned to his home near West Point.

Smith led Andre, dressed in civilian clothes, towards White Plains, NY. Smith turned back several miles short of White Plains leaving Andre to continue on his own. They were past the usual American lines and neither expected any trouble the rest of the way.

Three volunteer militiamen stopped Andre outside Tarrytown. Initially, Andre believed the men were British. His comments instantly made the men suspicious of him. Realizing his error, Andre offered the pass Arnold signed. It was too late. The men searched him and found the

papers hidden in his boot. They took Andre to Colonel Jameson at the post at North Castle. This was one of the posts that fell under Arnold's jurisdiction.

Jameson, like Tallmadge, earlier received a note from Arnold stating that Mr. Anderson was expected from New York and requesting that he be escorted to Arnold. Jameson assumed the prisoner was the same Mr. Anderson he'd been told to assist. The confusion came from the fact that this man was going towards New York, having already met with Arnold, and he carried incriminating papers in his leggings. Jameson decided to send Mr. Anderson on to Gen. Arnold as he'd previously been instructed. He sent the confiscated papers to Gen. Washington.

Later that day, Tallmadge arrived at North Castle and learned of the prisoner and his papers. He became suspicious. Even if Anderson stole the papers without Arnold's knowledge, it was apparent that Arnold met with a spy for some reason. If not incriminating, it was highly suspicious.

Tallmadge urged Jameson to recall the soldiers escorting Anderson and return the prisoner. Jameson did, but, since Arnold was the commanding officer of the area, Jameson insisted on sending him a letter concerning the incident. The captured documents continued on to Washington who was also on his way to Arnold's headquarters from another location.

When Andre learned the documents were being taken to Gen. Washington, he knew he was lost. He confessed to being Major John Andre, Clinton's adjunct-general. Here was Tallmadge's proof of Arnold's guilt. Unfortunately, he knew Jameson's report would reach Arnold before he could.

Arnold received the report the morning of Sunday, September 24th. Hurriedly Arnold ordered a horse and asked that Gen. Washington, who was expected shortly, be told that he had urgent business at West Point. He mounted up and rode away to the nearest British outpost, making his escape.

Washington arrived as planned at Arnold's home, breakfasted, then went to West Point where Arnold claimed he would be. The captured documents and Andre's confession finally reached him. Washington must have been stunned that the brave, trusted, and tactically brilliant general was in fact a traitor. He didn't hesitate long, however, and quickly sent Alexander Hamilton to catch up with Arnold, but Arnold was already safely behind British lines aboard the *HMS Vulture*.

At Andre's trial, he admitted he traveled under a false name in civilian clothing, though he stipulated that these were against his wish. He also admitted that he came across the lines without a flag (a recognized legal devise used to permit communications between enemies) and met with Benedict Arnold. He confessed that the confiscated papers had been found on him concealed in his boot. Despite letters from Arnold, Gen. Clinton, and a third party aboard the

Vulture attesting to the fact that Andre was under a flag and following Arnold's orders, Andre was found to be a spy and sentenced to death.

By all accounts, Andre died with dignity and honor despite the circumstances that took him to the gallows. As for Arnold, he became a brigadier general for the British and actively fought the Americans even in his home state of Connecticut. After the war he and his family moved to England where he was never truly accepted.

Arnold's turning also shut down the Culper Spy Ring for some time. Several of the spies feared that Arnold knew their names and had revealed them to the British. Arnold did know that Tallmadge ran a network in New York City and at one point sought out their names on the pretext that as commander of West Point he could use their services as well. Fortunately, no one provided the identities to Arnold and the spies remained undetected. However, Washington felt the loss of intelligence for several months.

Eventually Townsend agreed to provide information again, but he refused to write it down. Woodhull was forced to travel to New York to learn what Townsend could convey. This resulted in less frequent communications and of lesser value. But even as Washington continued his siege on New York, much of the battle activity moved away from New York to the southern states in the winter of 1780-81.

The Tide Turns for the Americans

In the summer of 1781, British general Sir Henry Clinton ordered Gen. Charles Cornwallis to fortify a post to protect ships in the Chesapeake. He, along with Admiral Graves, suggested York might be favorable. Cornwallis knew that the towns of York and Gloucester, which lay across the York River from each other, could not easily be defended. However, given the options he agreed, "to seize and fortify York and Gloucester, being the only harbour in which we can hope to be able to give effectual protection to line of battle ships."[49]

And so, Cornwallis found himself forced to defend posts that "would require a great deal of time and labour to fortify… [sic] For York and Gloucester, from their situation, command no country;"[50]

Meanwhile, George Washington still hoped to win back New York. He'd been laying siege to the town all summer and hoped the activities in the south would draw Clinton away, thus weakening the defenses around New York. He planned an assault on the city with Rochambeau's forces and the additional French forces of Admiral de Grasse who was coming from the West Indies. However, on August 14, 1781, Washington learned that the French fleet

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[49] Charles Cornwallis, *An Answer to that part of the Narrative of Lieutenant-General Sir Henry Clinton, K.B. which relates to the conduct of Lieutenant-General Earl Cornwallis During the Campaign in North America in the year 1781* (London, 1783.) p. 174 Google Books. 2011

[50] Ibid. p, 173-4.

would go no farther than the Chesapeake Bay. De Grasse would use his fleet, and the troops they carried, to stop the British from establishing a stronghold at the bay.

George Washington changed his mind about New York and turned his attention to the south. Along with Rochambeau, Washington began to plan an attack on Cornwallis in Virginia. Washington disguised their activities by playing into Clinton's assumption that the Americans would attack New York. He made it look as if he planned to move troops to Staten Island and he set up a false camp in New Jersey knowing Clinton's spies would report it. His deception worked and Clinton didn't realize the Americans' true intentions until the French and American troops were well on their way south.

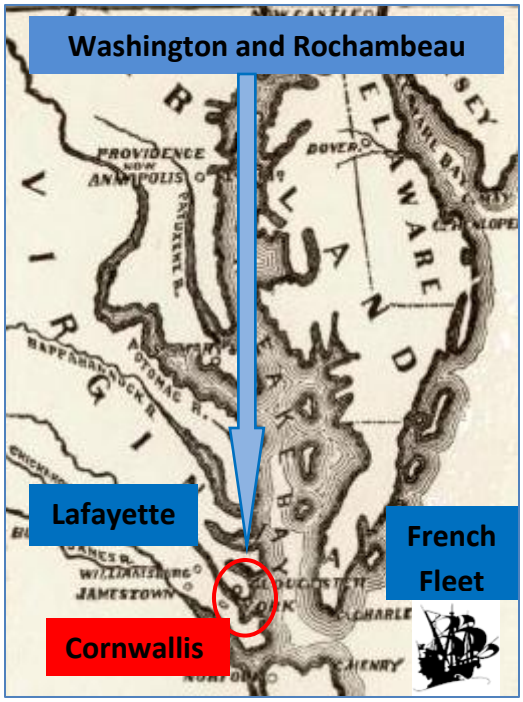

Figure 9: The French fleet at the Chesapeake and Washington's march to meet Cornwallis at Yorktown

August 30, 1781, de Grasse and the French fleet arrived at the mouth of the Chesapeake Bay from the West Indies. He brought with him, not only 28 ships of the line and supporting frigates, but 3,000 French troops to reinforce Lafayette's men in Williamsburg, Virginia.

For the next week, almost daily, Cornwallis sent encrypted messages to Gen. Clinton informing him of the arrival of de Grasse and the number of ships involved.

Clinton intended to reinforce Cornwallis. He first sent Admiral Graves and some of the British fleet to the Chesapeake. He would wait for Admiral Digby to arrive with more ships and troops from Europe and then they would relieve Cornwallis.

The Americans intercepted a message Cornwallis sent on September 8th. It once again describes the arrival and forces of the French fleet between the capes of the Chesapeake. Cornwallis adds to this letter that Washington and his troops were expected to arrive soon and reports that Lafayette was in Williamsburg. Cornwallis also reports that firing was heard from the Chesapeake September 4-6.[51]

The firing would have been the Battle of the Chesapeake Capes. Admiral Graves' British ships met the forces of the French fleet under de Grasse. In order to communicate from one ship to another the British used a visual flag signaling system. The Americans had a copy of the flag code book. One of Washington's men, McLane, picked it up from James Rivington, Townsend's partner in the coffee house and printer of the King's paper in New York. How Rivington came

[51] Charles Cornwallis, "Letter to Henry Clinton 8 Sep 1781" *Washington Papers*, ‹http://memory.loc.gov/mss/mgw/mgw4.080/1000/1035.jpg›

to have the book is not known, but he was believed to be an ardent Loyalist and had frequent contact with the British military in New York. Access to the book may have come easily or secretively. Rivington turned the code book over to McLane, but it isn't known whether the man had the time to get the book back to the mouth of Chesapeake in time for de Grasse to make use of it in the battle.

In the end, with or without the flag code book, de Grasse defeated Graves. The British ships returned north, leaving Cornwallis to suffer the consequences.

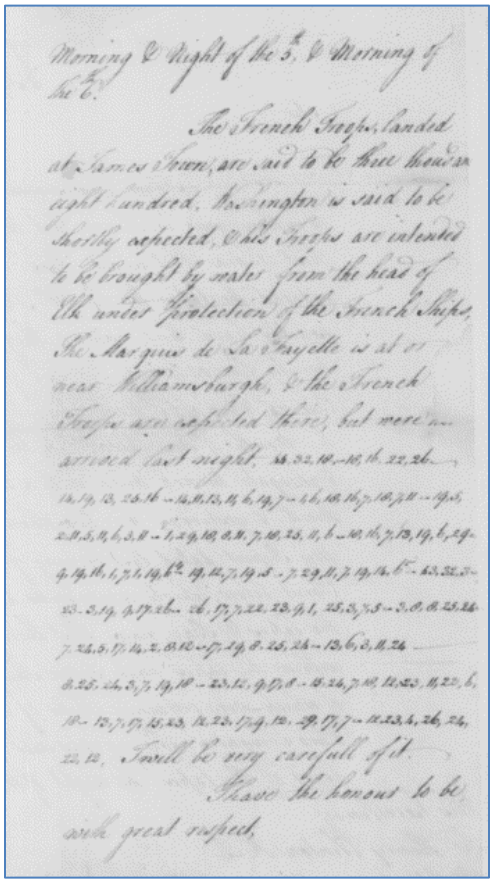

Figure 10: Cornwallis' partially encrypted message of Sept. 8, 1781 - Washington's Papers, Library of Congress

Following all this, Cornwallis, in his September 8th letter, reports on his own position. The details of the American actions were written in plain text, but he encrypts the portion of the message revealing his own situation. "As my works were not in a state of defence I have taken a strong position out of the town. I am now working hard at the redoubts of the place. The army is not very sickly. Provisions for six weks."[52]

The intercepted letter uses a simple substitution cipher. The alphabet is randomly scrambled and assigned a specific number between 1 and 29, less the numbers 10 and 20.

However, Cornwallis complicates the simple substitution slightly. First, he runs numbers together, separated only by periods, making it difficult to determine word length until it is actually deciphered. Second, after the first encrypted sentence, Cornwallis changes to a different cipher alphabet for the remainder of his message. The original cipher and the cipher change are indicated in separate number groups that include numbers higher than 29 (i.e. 44.32.10 and 43.32.3).

This message was one of several encrypted communications captured by the Americans. James Lovell in the Committee of Foreign Affairs solved the ciphers. Comparing messages taken from October 1780 through August 1781, Lovell realized that the British made only minor changes to their cipher. "For, it appears to me that the Enemy make only such changes in their Cypher, when they meet with misfortunes…"[53]

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[52] Ibid. For decryption, see also Cornwallis, *An Answer*, p. 192.

[53] James Lovell, "Letter to Nathanael Greene 21 Sep 1781," in *Letters of Members of the Continental Congress*. edited by Edmund C. Burnett (Washington, DC: Carnegie Institute of Washington, 1933) vol. 6, p. 224.

In late September, Lovell sent the keys to these ciphers to George Washington believing they might be of some assistance should the general have access to other intercepted messages. On October 6th, in a note to Lovell, Washington confirms, "My secretary has taken a copy of the cyphers and by help of one of the alphabets has been able to decypher one paragraph of a letter lately intercepted going from Lord Cornwallis to Sir Henry Clinton."[54]

These ciphered messages and the corroborating intelligence from other sources gave Washington a full picture of Cornwallis' situation. Cornwallis was desperate. The French fleet defeated the British at the Battle of the Chesapeake and controlled the mouth of the bay, the French troops transported by de Grasse reinforced Lafayette's forces, and Rochambeau's and Washington's troops had arrived from the north. Washington also had word from the north that Clinton and his troops had not yet left New York as they awaited favorable conditions to sail. With everything to his advantage, Washington moved his troops toward Yorktown, meeting little resistance along the way, and encamped outside Cornwallis' fortifications. The Seige of Yorktown began September 28th.

Completely surrounded, Cornwallis could not escape through the bay or by land. His only chance was to hold out until Clinton arrived with reinforcements. His messages to Clinton became more and more desperate as he reported the Americans encroachment and attacks. On October 11th, his encrypted message insisted, "I have only to repeat what I said in my letter of the 3d, that nothing but a direct move to York river, which includes a successful naval action, can save me." After describing the rebel actions, he relates, "We have lost about seventy men, and many of our works are considerably damaged; with such works on disadvantageous ground, against so powerful an attack we cannot hope to make a very long resistance."[55] Four days later another cipher letter conveys the deteriorating situation and concludes, "The safety of the place is, therefore, so precarious, that I cannot recommend that the fleet and army should run great risque in endeavouring to save us."[56]

Two days later, Cornwallis sent a letter to Gen. Washington requesting cessation of hostilities in order to discuss the surrender of York and Gloucester. Washington was happy to comply.

On October 19, 1781, Cornwallis' deputy officially surrendered to the combined French-American forces. General Benjamin Lincoln accepted the surrender sword at Washington's request.

The day after the surrender, Washington received more British intelligence. Even though Cornwallis had already surrendered, the information was still of some importance. It was an intercepted and decrypted message from Gen. Clinton to Cornwallis written on September 30th.

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[54] George Washington, "Letter to James Lovell 6 Oct 1781," *Washington Papers* ‹http://memory.loc.gov/mss/mgw/mgw4/081/0300/0391.jpg›
[55] Charles Cornwallis, "Letters to Sir Henry Clinton 11 and 15 Oct 1781," *An Answer*, p.204
[56] Ibid. p. 204-5

> "I am doing everything in my power to relieve you by direct move, and I have reason to hope, from the assurances given me this day by Admiral Graves, that we may pass the bar by the 12th of October, if the winds permit, and no unforeseen accident happens: this however is subject to disappointment…"[57]

In the accompanying letter from the President of the Continental Congress, Thomas McKean, Washington learned that McKean believed Clinton sailed on the 13th. In fact, Clinton and the British fleet were not able to leave until a few days later. Washington wasted no time in relaying this intelligence to Admiral de Grasse who had also received the information from McKean. When Clinton and the British fleet finally arrived at the end of October, he found the French alerted to his activities and learned that Cornwallis had already surrendered. The fleet returned to New York without engaging de Grasse.

Diplomatic Communications Conclude the War

The surrender at Yorktown signaled the beginning of the end for the British control in America, but intelligence continued to play a role throughout the remainder of the war. American representatives in Europe expressed the necessity for secret communications and they used a wide variety of encryption systems to accomplish it.

"Whenever you write to me," John Jay, the minister to Spain, wrote to Philadelphia businessman William Bingham in 1781, "recollect that your letters will, in nine instances out of ten, be inspected before they reach me; write nothing, therefore, that you would wish concealed."[58] He then proceeded to describe a code using *Entick's Spelling Dictionary*. Rather than using the page-column-word count method, he recommended that 20 be added to the page number and 10 to the word. To indicate which of the two columns the word was located, he put a dot over the first or second number. "For instance, the word *duration* is the first word in the first column of the 139th page, and must be thus written, $1\dot{5}9.11$"[59] However, when corresponding to a different Philadelphia businessman, Robert Morris, Jay suggested changing the page numbers by renumbering them from back to front.[60]

Code lists also became quite popular among the representatives to foreign countries in Europe. One of the earliest two-part codes to be used in America was developed in 1781. The page listed a series of numbers on one side and selected words, letters, or syllables in alphabetic order on the other side. The users could randomly write in the words next to the numbers to create their own code. The corresponding numbers being written on the opposite side next to the words.[61]

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[57] Sir Henry Clinton, "Letter to Charles Cornwallis 30 Sept 1781," *An Answer*, p. 202-3.
[58] John Jay. "Letter to William Bingham, 8 September 1781," ‹http:www.familytales.org›
[59] Ibid
[60] "John Jay letter to Robert Morris, 19 November 1780," ‹http:www.familytales.org›
[61] Kahn, p. 184.

This type of code was first used by John Laurens in March 1781. Congress sent him to France on a special mission to raise funds, purchase military supplies, and work to further military coordination with France. Using a code sheet with 660 numbers, his message contained more than 100 lines of code to George Washington. It concerned a meeting he'd had with the Count de Vergennes, the French foreign minister, where he'd made his plea for military supplies. It was followed a month later by another coded message relaying the lack of response to his requests.[62]

The Secretary of Foreign Affairs, Robert Livingston, created code sheets for use amongst the representatives in Europe. His pages used as many as 1700 numbers. Several place names and commonly used words had more than one number assigned to them. This allowed the sender to use different codes for the same words in an effort to make it difficult for the adversary to solve. Also in many cases, several words or syllables shared the same number.

Figure 11: Robert Livingston Code List from 1781 - Washington's Papers, Library of Congress

In his instructions, Livingston suggests: "When more than one word is represented by the same cipher, if it should be equivocal, it may be proper to show which is designed by drawing two strokes under the second and three under the third." As an example, he uses <u>788</u> with two underlines to mean 'DIFFER.' Three lines would indicate 'DIFFICULT.' However, he concludes that this will only be necessary at the beginning of a line because the correct word choice should be apparent within the context of a longer sentence.[63]

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[62] Weber, p. 79.

[63] Robert Livingston, "Letter to George Washington 27 June 1782," *Washington Papers* ‹http://memory.loc.gove/mss/mgw/mgw4/086/0000/0035.jpg›

Many other systems were employed during the Revolution. Each code or cipher system differed from the others in the key that was used. Because Livingston's 1700 number code list could be filled in with any words in any order the creator wanted, duplicates needed to be meticulously copied and sent to his intended recipients. Likewise, different cipher alphabets could be created using different keywords as Lovell prescribed or with a wide range of character/symbol assignments such as the one Dr. Church used. Again, the key needed to be accurately copied and transmitted to the receiver prior to messages being sent in that system. Because so many people created their own systems for correspondence with specific individuals, a multitude of different codes and ciphers were constantly in use. This could be quite confusing and required that multiple systems be held by each person.

As an example, Francis Dana, one of the representatives abroad, used a short code list combined with cipher alphabets for encrypting words not included in the code. In his communications with Robert Livingston, the Secretary of Foreign Affairs, his cipher used WAR as the key, but when writing to John Adams the key was WHO. Dana also used book codes, but complicated them as well. Instead of the standard page-line-word code group, he suggested to John Adams that, when using *Entick's Spelling Dictionary*, they should number the columns across both pages from right to left creating four columns (alleviating the middle number always being 1 or 2,) that they count the word from the bottom instead of the top, and that they use the page number of the opposite page.[64]

James Lovell, in the Committee of Foreign Affairs, encrypted official communications from the Continental Congress to its delegates abroad. This explains why the members of the Peace Commission in Paris received their instructions in Lovell's cipher. The message with their specific directions for negotiations on the peace treaty used the key created from the family name CRANCH making C and R the first letters of the cipher alphabets, though Lovell would have only vaguely and surreptitiously hinted at the keyword. Another message used JOHN as the key.

The instructions to the committee included the recommendation that they follow the direction of France. John Adams who, as always, had trouble deciphering the Lovell cipher, didn't read that part of the letter. Frequently suspicious, he even thought Franklin withheld that instruction from him intentionally. It wasn't one he was inclined to follow anyway.[65] In the end, the committee, particularly John Adams and John Jay, negotiated

Figure 12: Signing of preliminary peace treaty in Paris, November 30, 1782 - reproduction of painting by C. Seiler, Library of Congress

[64] Weber, p. 52. See also "John Jay letter to Robert Morris, 19 November 1780," ‹http:www.familytales.org›
[65] Gregg Lint and William Hay, "The Men Who Signed the Treaty of Paris," in presentation for *The National Archives Experience* 3 Oct 2008, p. 5 and 17. See also Weber p. 31.

with the British representative without consulting the French.

In November 1782, the British and Americans signed the preliminary treaty without the knowledge of the French. The final Treaty of Paris, signed in September 1783, put an official end to the War for Independence in America and established the United States as a free, independent, and self-governing country.

On November 25th the British evacuated New York. George Washington victoriously entered the city right behind them. The Americans were finally in possession of New York City. One of Washington's first acts was to openly visit some of the spies who had helped his cause. Among them was James Rivington the printer of the *Royal Gazette*. This open patronage was intended to show the residents Rivington's true loyalties. Rivington also removed the royal crest from his paper and renamed it the *New York Gazette*. Unfortunately, he'd played the ardent Tory too well and he was out of business by the end of the year. Washington visited another of his spies in the city, but he never thanked Robert Townsend. Culper Jr. had never revealed his true identity and it would be centuries before anyone knew of Townsend's secret activities aiding in the War for Independence.

Conclusion

That independence, hard fought, was achieved with the help of codes, ciphers, invisible ink, visual communications, and hidden messages. These techniques protected information traveling between the United States and its representatives in Europe. They also helped George Washington decisively plan his strategy. Spies, particularly the Culper Spy Ring in New York, used various methods to keep him abreast of the British movements, supplies, and intentions. Because of their efforts, Washington learned of British spies in his midst as well as British plans against American and French forces. With this foreknowledge he was able to successfully protect the French fleet's arrival in Newport and make his move against Yorktown.

Unfortunately, secrets couldn't always be protected from trusted men who also served the British. Edward Bancroft had access to Ben Franklin and Silas Deane's communications and relayed what he learned to Britain using invisible ink. Men like Dr. Church and Benedict Arnold also supplied the British commanders with important details of the American intentions. Church used a simple cipher to inform Gen. Gage of Patriot supplies and plans. Arnold used a dictionary code and told the British of Washington's movements as well as proposing the sale of a major, strategic American stronghold, West Point.

The British too, used similar methods to communicate their own secrets. Hiding messages behind masks or secreted inside ordinary objects were common ways to protect their information. However, long practiced in the arts of encryption, they used other techniques to a great extent. Benjamin Thompson used invisible ink to provide details of rebel intentions very early in the war while Cornwallis used ciphers to relay his situation at Yorktown near the end of the war.

Reading intercepted encrypted messages of the British gave the Americans vital information. Understanding intercepted messages between Clinton and Cornwallis helped confirm and solidify Washington's plan at Yorktown.

Although the war was not won or lost based on any one secret, the secrets of the revolution, those kept and those lost, played a role in changing the world.

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