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National History Day

May 13, 2013

Annotated Bibliography

Primary Sources

A Cryptographic Dictionary," NR 4559, Historic Cryptographic Collection, Pre-World War I Through World War II, Record Group 457,The National Archives and Records Administration (NARA) 8601 Adelphi Road, College Park, Maryland.

Created in Bletchley Park in 1944, this source is a dictionary of many terms the code breakers used while working and breaking the ciphers. This defines simple words such as “decode” and “decipher” as well as complex words such as “Kennbuch” and “Zenit.” It also explains common misuses of words such as the differences between decode and decipher. According to this dictionary, when one deciphers, he is stripping the code and forming code groups, while when one decodes he is using the code groups found from deciphering and turning them into plain language. This proved to be a very helpful resource to better understand both primary and high level secondary documents.

"A List of Cryptographic Terms in Use With the Abwehr and the Sicherheitsdienst." *Page 1*. WWII Archives, n.d. Web. 14 Oct. 2012. <http://www.wwiiarchives.net/servlet/action/document/page/1196/0/0>.

This report on German ciphers details specifically the use and variation of cryptographic terms in the Abwehr and the Sicherheitsdienst (SS) encoded messages. The report first identifies an increase in the use of German synonyms as in part due to the the fact that Abwehr communications go between different services, that the SS is somewhat less traditional, and the very nature of the German language itself. The report then proceeds to supply a list of the most common synonyms in usage, as well as important German cryptographic terms. The knowledge of such terms can then potentially be used as cribs by the recipients of this report.

*After the Battle of Cape Matapan*. *British Pathe*. N.p., n.d. Web. 30 Oct. 2012. <http://www.britishpathe.com/video/after-the-battle-of-cape-matapan>.

Published in 1941, this short video gives insight into how the Allies felt after their victory at Matapan. It shows a variety of images of Italian prisoners of war, showing what the Allies had gained. It then remarks that Italians lost ships while the Allies lost, “not a man, not a ship, not even a square inch of paint,” showing the great success of the battle. Overall this video showed us how the naval victory at the Battle of Cape Matapan boosted the Allies’ morale and was a great triumph for the British Royal Navy.

Balme, David. "David\_balme\_rn." *David\_balme\_rn*. N.p., n.d. Web. 19 Sept. 2012. <http://www.goldonian.org/david\_balme\_rn.htm>.

 In this primary source, David Balme gives his detailed personal account of how he led a crew onto the German U-Boat, U-110. He talks about how he went down into the U-boat through the hatch, only to find it deserted. Inside they found many books which they started removed and took back with them onto the Bulldog - the English ship they were on. Their telegrapher went into the communication room and thats where he found the enigma machine which he found it interesting and also sent it up the hatch along with everything else. They did not end up destroying the U-boat because this way, the Germans would not know that the U-boat had been raided. Because of this, for the rest of WWII, the Germans kept using the Enigma code, not knowing that the Allies had broken it.

Batey, Mavis. Interview by Michael Smith. *Bletchley Park*. Bletchley Park, 28 Mar. 2011. Web. 27 Sept. 2012. <www.bletchleypark.org.uk/news/docview.rhtm/640012>.

Mavis Batey was a nineteen year old college student when she first began to work at Bletchley Park decoding Italian messages for the British. She worked for Dilly Knox, and was one of his “girls.” In this interview, conducted by Michael Smith, Mavis explains many different things about Bletchley Park and Ultra gained intelligence. She first focuses on how different people were recruited to work at Bletchley. She was recruited to Bletchley because she was studying German language in college, which was important in reading the decoded messages. Many linguists were recruited to Bletchley Park, rather than the expected mathematicians in order to better understand the decoded messages. Mavis also explains the tedious and painstaking jobs they had to do to break the code. She explains the process of rodding, a method used to decode messages, and how they had seventy eight possible positions they had to go through to decode a message. She explains that Alan Turing’s bombe mechanized this process and was able to decode messages much faster than the thousands of human workers at Bletchley, but also explains that this machine was not the world’s first computer. Mavis herself decoded a message that allowed the Allies to find out when the Italians were going to attack in the Battle of Cape Matapan, which allowed them to win this battle, marking the first time Ultra related intelligence had directly affected a battle of the war.

*Be Careful What You Say*. N.d. Photograph. British Public Records, London. 1939. Web. 8 Oct. 2012.

This British wartime poster is helpful in understanding the significance of code breaking during World War II. With the rise of telecommunications there came a whole new method of espionage and trickery. In the poster the mounting concerns of the British in regard to signal traffic security are reflected. The fact that the British government had to produce publications regarding information security during World War II speaks to the significance of codes and codebreaking in the European theatre. By examining propaganda of the time we may gain a better insight into the ideals of the time which allows us to better understand the context of our topic as well as its significance.

Bennett, Ralph. "Ultra and Some Command Decisions." *Journal of Contemporary History*16.1 (1981): 131-51. *JSTOR*. Web. 28 Sept. 2012. <http://www.jstor.org/stable/260620>.

Ralph Bennett was a member of Hut 3 at Bletchley Park and writes this scholarly journal article to find the impact of Ultra on World War Two. Although he himself worked to decipher land battle codes he explains that one impact Ultra had was to control the U-Boat blockade in the Atlantic. He also states that Ultra was mainly used not for battle tactics, but for general strategy. The usefulness of Ultra depended on how the messages were intercepted, the success of the codebreakers, and the amount the Germans used the coded message machines. Ultra was also used during the Anzio Landing in that by knowing German and Italian messages, Allies were able to find out that no Axis forces were moving toward the coast of Italy and were therefore able to land safely. Also, Ultra allowed for the ability of the Allies to know that D-Day was going to be successful. They knew that resistance would be light because the Axis forces were elsewhere, not on the coast.

Britain. *Report on Enigma Decipherment, 1 November 1939*. N.p.: n.p., n.d. *Alan Turing*. Web. 9 Sept. 2012. <<http://www.turing.org.uk/sources/nov39.html>>.

This report was written in 1939, at the very beginning of World War Two, only three months after Britain had received information on Enigma from the Poles. The document contains information known by the British about the Enigma code and machine at this time, which was very small. It also mentions plans about what the British need to do in the future to better utilize information from the Enigma code. It states that a machine similar, but larger and more complex than the Polish Bombe needs to be made. The British knew that this would allow more messages to be decoded in a shorter amount of time than done out by hand. This report is signed by many of the well known Bletchley Park workers including Alan Turing, Gordon Welchman, and Dilly Knox.

Calvocoressi, Peter. *Top Secret Ultra*. New York: Pantheon, 1980.

Peter Calvocoressi was a worker at Bletchley Park and writes this memoir from his own point of view. He explains the uses of Ultra and its impact on World War Two. Ultra had little impact until 1940 because the breaking of the code was too slow and not complete enough. It did though provide insight into the scale of the Battle of the Blitz and allowed the British to know that a large air effort would be coming to their country. It also allowed the British to misdirect a few German bombings. In 1941, Ultra was able to be used more frequently and had more of an impact on the war because of its promptness. Calvocoressi also explains the importance of breaking the Naval Enigma code and how it allowed the Allies to capture and avoid German U-Boats.

Churchill, Winston. "Telegram from Prime Minister Winston Churchill to US President Truman June 1945." Letter to President Truman. June 1945. MS. N.p.

This is a letter written by Churchill to the new president of the United States, Truman.  He tells of the success that they had just had: the surrender of the Germans in the Battle of the Atlantic. Churchill says that since the September of 1939 it had been “a relentless struggle” against the Axis and he acknowledges that most of the credit should go to the high skill of the technical staff and scientific staff. Understanding what the technical staff had done, allows us to make inferences about how Churchill was really congratulating the codebreakers of the Enigma.

"Comparison of Our "003" Type of "Bombe" with the Rotary Type." *WWII Archives*. N.p., n.d. Web. 14 Oct. 2012. <http://www.wwiiarchives.net/servlet/action/document/page/725/1/0>.

This report compares the US 003 type of Bombe with the British rotary Bombe. The report notes such comparisons as the 003 is made of more standard parts, it operations quicker, provides more complete information (it runs in half the time), and is easier to run and maintain than the rotary Bombe. However, the report acknowledges the 003 is more unwieldy and takes up four times the space as a typical British Bombe, and also has a much greater initial cost than the rotary type. The report concludes that for operational purposes, due to its efficiency and its ability to develop new methods for research, the US 003 Bombe is far superior to the British rotary Bombe.

D., Commander. "U-boat Archive - U-110 - 3rd Escort Group Report Capture of U-110."*U-boat Archive - U-110 - 3rd Escort Group Report Capture of U-110*. N.p., n.d. Web. 16 Sept. 2012. <http://www.uboatarchive.net/U-110-3rdEscortGroupCaptureofU-110.htm>.

This is a letter from the Senior commander of the Bulldog (Commander D), talks about the days adventure which started with open gunfire on a german submarine they encountered and attacked. Commander D talks about how the German crew seemed dazed and not sure of what to do. The crew then abandoned the boat which was now free to examine. They lost no time going into the submarine through the hatch and retrieving all of the books, charts and documents. They then hooked up the U-Boat and began to tow it back with them to Iceland. However, on the  way back the U-boat began to sink and they had to cut the wire. Because of this, the Germans never found out that the U-boat had been found and believed it had been sunk.

"Decrypted and Translated German U-Boat Intercepts." *WWII Archives*. N.p., n.d. Web. 14 Oct. 2012. <http://www.wwiiarchives.net/servlet/action/page/Original\_docs>.

This archives provides 5639 decrypted and translated U-boat intercepts spanning from 1941 through 1946. These messages are incredibly useful in providing the scope of the work required to translate the thousands of messages for Ultra, and how few of them offered much use upon decryption. This database of course also provides a wealth of information in terms of searching for particular U-boat decryption throughout the war that hold the most significance. It also is helpful in demonstrating what a typical U-boat message read like, and what the Ultra translations looked like.

Ettridge, Joy. "HUT 6, Bletchley Park." *BBC News*. BBC, 07 June 2005. Web. 14 Oct. 2012.

<http://www.bbc.co.uk/history/ww2peopleswar/stories/61/a2429561.shtml>.

Ettridge’s account of her recruitment into the Bletchley Park division as well as her time at Bletchley provides a very interesting firsthand account of life in Britain’s code breaking center. The first very interesting aspect of Ettridge’s account is her explanation of how one was recruited to be a member of the Bletchley Park code breaking division. She talks about how for certain people getting recruited was a very cloak and daggers process involving anonymous letters and meetings at random locations, while for others it was a normal job application. Another very interesting aspect of Ettridge’s account is that she discusses how gender roles were nonexistent inside Bletchley Park. Rank was based on knowledge and experience and not on gender at all. This is particularly interesting because it shows that code breaking was so important to Britain that Britain was willing to tear down traditional social roles. This just further demonstrates the significance of Ultra and Bletchley Park.

*European Axis Signal Intelligence in World War II as Revealed by "TICOM" Investigations and by Other Prisoner of War Interrogations and Captured Material, Principally German*. Rep. no. 3560816. Army Security Agency: Washington DC, 06 Jan. 2009. Web. 23 Sept. 2012.<<http://www.nsa.gov/public_info/_files/european_axis_sigint/volume_2_notes_on_german.pdf>>.

This report was released in 2009 and documents the investigations by TICOM teams rounding up German cryptologists and high ranking personnel to determine how secure the Enigma machine actually was and how secure the German forces believed it to be. The report concludes that while the Germans had excellent cryptography techniques (encoding) they had neither the resources nor the cryptanalytic capabilities (deciphering) to comprehend how their codes could be broken. Thus, despite the Allied successes in the Battle of England, the African campaigns, the Battle of the Atlantic, and causing terrific German military losses, the Axis powers continued to place blame on technologies, such as radar, and bad luck.

Germany. Supreme Command of the Navy. *The Enigma Offizier And Staff Procedure*. Comp. Tony Sales. N.p., 2001. Web. 14 Oct. 2012. <http://www.codesandciphers.org.uk/documents/officer/officer1.pdf>.

This secret German publication from 1940 instructs the German workers with explicit steps as to how to encipher and decipher messages on the Enigma machine. There are fifteen steps to encipher a message, showing the careful precautions the Germans took in order for their code not to be broken. There are also strict regulations as to who the code in their intermediate enciphering form can be shown to and the consequences for those that do not follow these regulations. This helps to give us a sense as to why the Germans believed that their code was impossible to break and continued to use it well throughout the war, and allowed the Allies to gain Ultra information.

Godfrey, Kathleen K. "Breaking the Code: A WAAF at Bletchley." BBC News. BBC, 16 March 2004. Web. 14 Oct. 2012. <http://www.bbc.co.uk/history/ww2peopleswar/stories/42/a4163942.shtml>.

Kathleen Godfrey, daughter of the Director of Naval Intelligence during World War II, provides a wonderful description of life in the Air Force as well as life working at Bletchley Park. In her account Godfrey talks extensively about her training before being allowed to work at Bletchley. Because she was not a civilian with a background in code breaking, she had to undergo extensive training. Godfrey talks about what it was like to go through training and how it was horribly uncomfortable and difficult. She also talks about the great deal of secrecy surrounding her work at Bletchley. One of the stories she recounts is about a meeting with her father, the Director of Naval Intelligence, in which she and he had nothing to talk about because all of their work was strictly classified. Another very interesting point that Godfrey makes is that the government frequently asked the public for help in their intelligence efforts. The government requested that the public send in their family vacation photos that showed the coastline of mainland Europe and the Mediterranean so that they could be used in producing invasion maps. It was interesting to see how the public played a role in military efforts.

Hinsley, F. H., and Alan Stripp. *Codebreakers: The inside Story of Bletchley Park*. Oxford: Oxford UP, 1993. Print.

Hinsley’s book about his own and other’s experiences operating in Ultra during World War Two is most significant in its descriptive analysis of the exact effect of Ultra upon the war. Hinsley does this by evaluating the effect of each significant decryption made by Ultra on the war, and contemplating the possible courses of action that would have occurred had Ultra not existed. He begins with the first developments to which Ultra made a contribution - the defeat of the Italian army in North Africa in February 1941, and builds to the most important contributions in the North African campaign against Rommel, the prevention of the U-boats from dominating in the end of 1941 and the winter of 1942-3, and the intelligence provided about German strengths prior to operation Overlord. This alone, Hinsley concludes, would likely have delayed the Normandy invasion until at least 1946 due to lack of resources, and in this time Germany would have had the opportunity to launch its V-weapon attack and brought in revolutionary U-boats. Therefore, while Hinsley concludes it is impossible to truly divine the alternative outcomes, it is reasonable to conclude that Ultra shortened the war by at least two years.

Hinsley, Harry. "The enigma of Ultra." *History Today* 43 (1993): 15+. *Gale World History In Context*. Web. 10 Sep. 2012.

Hinsley’s article from *History Today* provides a detailed look at the significance of the British codebreaking division at Bletchley Park code named “Ultra.” Hinsley uses a counter-factual evaluation of WWII to come to a conclusion about the impact of Ultra. While Hinsley ultimately determines that the Allies would have won WWII regardless of Ultra, he points out that without the advances made on the German Enigma code by Ultra, the war would have lasted two or even more years longer than it did. In his evaluation Hinsley, a member of the Ultra division, discusses how a variety of factors including the size of Ultra, German U-Boat attacks, and Allied tactics were influenced by Ultra’s work and why cracking Enigma was a significant advance in the war.

Hinsley, Harry. "The Influence of ULTRA in the Second World War." Speech. Babbage Lecture Theatre. 19 Oct. 1993. 26 Nov. 1996. Web. 30 Sept. 2012. <http://www.cl.cam.ac.uk/research/security/Historical/hinsley.html>.

This speech, given by Harry Hinsley, a war veteran who worked at Bletchley Park, gave us firsthand information about breaking the Axis codes. Hinsley explains that breaking the code was so useful because Germans had no idea that the Allies had the ability to break the Enigma and other codes. The Bletchley Park workers created and used machinery that was unheard of at the time of the war. This included the machine Colossus, the world’s first computer. The German’s also had a high level of confidence in their code, due to its complexity and did not believe that it was possible for it to be broken. Hisley also talks of the secrecy of the Allies in the use of the gained information to protect the fact that they had broken the code from the Germans. Hinsley also explains the influence of Ultra on the war itself and the fact that it saved hundreds of thousands of tons in the U-boat battle in the Atlantic. The importance of Ultra is highlighted when Hinsley states that he believes that D-Day would not have occurred until at least 1946 (two years later) without the information gained from Ultra.

Instone, Ralph. "A Classical Scholar at Bletchley Park." *WW2 People's War*. BBC, 24 Oct. 2005. Web. 19 Oct. 2012. <http://www.bbc.co.uk/history/ww2peopleswar/stories/86/a6356586.shtml>

 Logically, it makes sense that cryptologists, mathematicians, and other such people were employed at Bletchley and this firsthand account told us exactly what it was like to work as a cryptologist during WWII. He claims that the Ultra mission and specifically the work done at Bletchley shortened the war by three years, which agrees with other information regarding this fact that we have found.

Marion. "The Listeners: WRNS Listening Posts." *BBC News*. BBC, 18 Nov. 2003. Web. 14 Oct. 2012. <http://www.bbc.co.uk/history/ww2peopleswar/stories/03/a2059003.shtml>.

In this primary source, Marion details what her job was like working at an English listening post during World War II. This description of how transmissions were intercepted is very interesting because it explains some of the backstory to Ultra and Enigma. All other sources simply talk about receiving transmissions and having to decode them, but never once do they talk about the actual logistics involved in obtaining the encoded transmissions. It was very interesting to read about the technology involved in these interceptions as well as the manual scanning methods that were used. To find the transmissions, the British would simply scroll very quickly through various radio frequencies over and over again, waiting for a hit on one of them. Marion’s description of the tremendous time and effort required to obtain results speaks a great deal to how invested Britain was in obtaining enemy secrets.

National Security Agency. "Declassified NSA/CSS Documents Released to NARA." N.p., n.d. Web. <http://www.mountainvistasoft.com/crypto/nara.titles.htm#NR-3506>.

This is a document containing the titles of primary sources, and secret documents that Bletchley park and the Codebreakers were working on. This gave us a good idea of the kinds of things that they focused on, and also the kinds of messages that the Germans were sending back and forth. A lot of the messages are titled as intercepted German messages such as *German Air  Code* or german *Military Code List*. It shows how the Allies documented every single piece of their progress such as little things like capturing code books. However, it also shows how the Allies were able to gather a large amount of important information that would definitely give them the upper hand in knowing the goals and mindset of the other side. For example, they decoded documents when the germans were talking about war in Russia.

Rejewski, Marian. "An Application of the Theory of Permutations in Breaking the Enigma

Cipher." Applicaciones Mathematicae 16.4 (1980): n. pag. Stockholm University. Web.

23 Sept. 2012.

Rejewski’s paper on the application of permutation theory to the Enigma code is extremely valuable in understanding the difficulties that Rejewski and his team faced in deciphering Enigma. Rejewski’s breakdown of his mathematical principles applied to Enigma provides a highly view into the thinking process of the Polish cryptographers. Not only does Rejewski explain the mathematical difficulties of deciphering Enigma, but he explains the difficulties that he faced at the time with the technology available to him and how various historical events aided him in cracking Enigma. Rejewski explicitly mentions turning points in his work, such as obtaining a German cipher manual from the French in 1932, which aided us in establishing the historical context of Rejewski’s work. There exists one downside to the source in that Rejewski, a Pole by birth, did not have an excellent grasp on the English language when he wrote the paper. The grammatical errors coupled with the complexity of the permutations that Rejewski employs makes the document very difficult to digest.

Rejewski, Marian. "A Conversation with Marian Rejewski." Interview by Richard A. Woytak.

n.d.: n. pag. Florida Gulf Coast University. Web. 23 Sept. 2012.

Woytak’s interview with Rejewski proves to be one of the most engaging and informational primary sources we have found. The source is the original transcription of the taped interview between Rejewski and Woytak and contains absolutely everything. What is the most valuable about the source is that it contains Rejewski’s explanation of how he became involved in the Polish Cipher Bureau and how his team went about solving the encryption. In the interview Rejewski discusses all the way from his college years to the end of the war and beyond. He provides great insight into the actual Polish Cipher Bureau as well as an inside look at many of Enigma’s big turning points. Rejewski talks at length about the meeting between the French, British, and Polish which is arguably one of the biggest turning points of WWII. Overall the source is excellent because it provides a first hand account of many aspects of Enigma in a wide context manner as well as a focused and specific one.

Rejewski, Marion. *How Polish Mathematicians Deciphered the Enigma*. N.p.: n.p., 1981. Print. <http://chc60.fgcu.edu/images/articles/rejewski.pdf>

 Marian Rejewski was one of the major cryptologists who solved the Enigma code first in Poland. Later after the war, he published this paper about the Polish Cipher Bureau which worked from 1932 to 1939. He tells the interesting detailed account of how the Enigma Machine was sent by the Germans to the Polish Cipher Bureau and it was a mistake. The person telling them to give it back and to not open it sounded so urgent that it awoke many suspicions in the Polish cryptologists. They were able to get a good look at the machine before they gave it back and when the first telegraphs came through the air, they attempted to break them.

Roosevelt, Theodore, President. "A Telegram Sent by US President Roosevelt to Prime Minister Churchill, November 1943." Letter to Winston Churchill. Nov. 1943. MS. N.p.

Confirming that the Battle of the Atlantic was starting to turn in favour of the Allies, Roosevelt writes to Churchill explaining how there are less and less U-Boats to be sunk. The Ally air force has sunk so many that they are not appearing as frequently. On top of this, not as many English ships are being attacked or sunk by the U-boats. Because this letter was written in 1943, just after the Codebreakers started cracking the German Enigma codes, this letter is proof that because they were able to detect the signals from U-Boats and intercept the German messages, they were  more prepared and were able to gain the upper hand.

Russell, Irene Joan. "From School Girl to Code Breaker." *WW2 People's War*. BBC, 10 Aug. 2004. Web. 18 Oct. 2012. <http://www.bbc.co.uk/history/ww2peopleswar/stories/07/a2907407.shtml>.

 We knew from previous research that women were the primary source of code breakers for the Ultra mission and this article explained exactly how the war was in a female code breaker’s opinion. She explained how she ended up working at Bletchley Park and how unaware she was of the other divisions, all for secrecy. She had even interacted with Churchill himself and described what his visits to Bletchley were like. She is still connected with the war in that her husband fought in the North African Campaign, which means that she not only knows about Blechley but also some about the African fight from talking to her husband. An interesting part of this person’s story is that she was only 18 when she received papers informing her that she was moving up in the ranks, on her way to Bletchley. One of her interests was crosswords, which probably helped her join the elite crew in Britain. All of this primary account was very interesting and gave us a really good sense of what it was like.

Scherbius, Arthur. "Patentschrift." *Crypto Museum*. Paul Reuvers & Marc Simons, n.d. . 28 Oct. 2012.<<http://www.cryptomuseum.com/crypto/enigma/patents/index.htm>>

The only small problem with this source is that it is written in German; other than that, it was a great find. This original patent was very helpful. It included photos of the original prototypes of the German Enigma machine, which were pretty cool to look at. Scherbius often does not receive his due credit because Alan Turing gets most of the praise and respect. Furthermore, we have read sources by Paul Reuvers and Marc Simmons before and we know that they are reliable, authoritative people. This primary source, although impossible to actually read, was quite helpful.

Staddon, Kay. "Enigma and All That - in the A.T.S. 1940 to 1945." *BBC News*. BBC, 27 May 2005. Web. 14 Oct. 2012. <http://www.bbc.co.uk/history/ww2peopleswar/stories/33/a4122433.shtml>.

Staddon’s explanation of her job working for Britain’s Wireless Intelligence Service provides further background to how the valuable enemy transmissions decoded by Ultra were obtained. Staddon talks about how her branch would receive hundreds of intercepts all coming through in groups of five letter clusters. She also talks about something that is discussed in no other sources and that is the frustration that she and her team felt when they were working. None of the transmissions that they received were ever shown to them and they had no idea how the work they were doing was impacting the war. It was rather mind blowing to realize that the work that all of these people did every day meant pretty much nothing to them. They knew that they did something for the government, but because of the Official Secrets Act they knew nothing of how they were actually helping the war efforts.

Sweetland, Miss. "Memories of Miss Sweetland." *Welcome to Adobe GoLive 4*. Bletchley Park, n.d. Web. 30 Oct. 2012. <<http://www.mkheritage.co.uk/bpt/women/Sweetland.html>>.

 We used this primary reflection to further understand specific important women that worked at Bletchley Park. Although most of this article was not important to us and mostly just interesting, we learned some key names and their respective jobs. One small problem with this source is that Miss Sweetland is writing about an event that happened 56 years ago, as she clearly points out. Her memory may not be perfect and she may accidentally misrepresent some facts. Nonetheless, we felt confident that the general gist of her statement was correct and the parts that we looked at carefully seemed to follow along with everything else that had been written.

Taylor, Telford. *Early "E" History*. Rep. Vol. 289. N.p.: National Archives and Record Information, n.d. Print. Ser. 3091.

This 1944 memorandum demonstrates the American knowledge of early Enigma history and the role played by the Poles and the French. It notes Knox, the British, and the French's lack of success and lack of knowledge of the Pole's success prior to July 1939. It notes Knox's angry reaction to discovering this information, but that the British gained significant notes on the building of bombes and the decrypting of Enigmas. It also comments on the change in German keys at the beginning of war, and the German capture of several Poles and Frenchmen aware of Enigma decryption.

*The Tentatve List of Enigma and Other Machine Usages*. Rep. N.p.: Bletchley Park, 1945. 2001. Web. 14 Oct. 2012. <http://www.codesandciphers.org.uk/documents/eusage/usage.pdf>

Written in 1945, this report lists the uses of many enciphering machines that were used during World War Two. Because we are focusing on the Enigma Code for our project we focused on the first two machines, the Naval Enigma and the Army and Air force Enigma. This document explains that there were 1344 different possibilities for the location of the four wheels. It also explains that the machinery the British had currently possessed was satisfactory to decipher and decode the messages (the thirty-two unit bombe). The Army and Air Force Enigma machine had only three wheels as opposed to the Naval Enigma’s four. The three wheel bombe is used to decipher the code if the reflector is known, while a long crib is used if the reflector is unknown. This Army and Air Force machine is also used in parts of France.

*The Turing Digital Archive*. King's College, Cambridge, n.d. Web. 10 Sept. 2012.

<http://www.turingarchive.org/>.

When we first accessed this site, it looked insignificant. But after maneuvering through the maze of files for a few minutes, we realized that we had found a jackpot. Hundreds, probably thousands of images and original notes were compiled in this one archive. With names like “A.M. Turing's original proposal” and “letters to AMT’s mother, dated 1923-1954,” this archive was full of primary sources. For a website, this will be very helpful to show the viewer exactly what things looked like and let them experience it through the descriptive images. We briefly looked in the Enigma file and saw that it was dated 1939-1942, which makes it a perfect primary source. Many “primary sources” were written in the 1970’s, when the Ultra mission was made public. The pictures in the Enigma file were typed notes with handwritten explanations on the side and little drawings, presumably done by Alan Turing himself. This will need much more combing through and even though we were only on it for fifteen or thirty minutes, we could already tell how valuable it is.

Turing, Alan. *Computable Numbers with an Application to Entscheidungsproblem*. N.p.: n.p., n.d. Print.

This is a book published by Alan Turing about his concepts and ideas relating to machines. Turing talks about the Entscheidungsproblem, meaning decision problem, and in the very first couple paragraphs, blatantly says that there is no solution to the Decision Problem founded by David Hilbert. This source shows how smart Turing was in terms of computer science- The Theorem proving that the Entscheidungsproblem had no possible solutions was named after him and Alonzo Church, the Church- Turing theorem. This book also gives an idea of how Alan Turing’s mind worked. He first starts talking about finite numbers and how the machine is able to compute these numbers, giving us insight to the knowledge that Alan Turing obtained, which gave him the ability to finally crack the Enigma code.

Turing, Alan. *Notes on the Enigma Machine*. Rep. The National Archives | Research, Education & Online Exhibitions | Exhibitions | Secrets and Spies, n.d. Web. 23 Sept. 2012. <http://www.nationalarchives.gov.uk/spies/ciphers/enigma/en1\_x.htm>.

This excerpt from Alan Turing's notes explains several of the key principles behind the decryption of Enigma. Particularly important is that Turing notes the principle of reciprocity with regards to the plugboard connections - that if P enciphers to G, G will in turn encipher to P. Turing also notes that no letter can be enciphered to itself, which is the main principle behind the strategy of using cribs to decode messages. In addition, the passage includes several hand drawn pictures of Turing's initial understanding of the wiring of the machine.

Turing, Alan. *The Essential Turing*. Ed. B. Jack. Copeland. Oxford: Oxford UP, 2004. Print.

 Although edited down to a book by Jack Copeland, *The Essential Turing* is a book that contains many letters and pieces of writing from Turing himself, about the achievements and mistakes of his current work of cracking the enigma code. Much of the documented work is too complicated for the ordinary mind to comprehend. For example, he concluded one day that “If we can give a rule which associates with each positive integer n two rationals an, bn satisfying an < anþ1 < bnþ1 < bn, bn  an < 2n, then there is a computable number a for which an < a < bn each n.” Turing was constantly looking for rules and constants that would help him make sense of the convoluted mess of random letters and numbers. This book also contains a short Biography of Turing’s life with all of his accomplishments. Turing was highly educated in the realm of computer science and invented the Turing machine which formed the foundation of modern computers today.

Turing, Alan. "Turing's Report on His Visit to NCR." *Visit to National Cash Register Corporation of Dayton Ohio* (1942): n. pag. Web.

 This primary source is Alan Turing recalling the visit to the United States where they were making the Bombs for decoding the enigma machine. He gives an explanation of what exactly the Bomb machine does. It is very interesting that Turing also compares the British values with the American values concerning the Enigma. He says that the Americans are not that concerned with the Enigma and he suspects that is because they do not pick up as many signals as they do in England.

Turing, A.M. (1950). Computing machinery and intelligence. Mind, 59, 433-460. <<http://www.loebner.net/Prizef/TuringArticle.html>>

 As we have found in our extensive research thus far, Alan Turing was extremely influential in the creation and success of the Enigma machine. This article, written by Turing in 1950, discusses his ideas of machines having the capability to think and use experimental processes to create results. He used his work with Enigma as a base for some of his ideas. This article discussed mathematical probability with regards to large numbers,. Although he did not focus on Enigma or talk about it directly, it was still very helpful to read something written by Mr. Turing himself, especially at a time when cryptology and modern computers were just getting started. This fed into our ideas about how the enigma is a turning point in cryptology, not just WWII. We know Turing is reputable, since he essentially created the Enigma machine. Although there may be a certain bias in an article written by him, this one focused solely on the mathematical side of things which helped avoid a distortion of the facts.

Ultra. Letter to Prime Minister. 24 June 1941. MS. London, England.

This letter from Ultra to the Prime Minister of England, Winston Churchill, provides excellent insight into the inner workings of England during World War II. Discussed within the letter are Britain’s concerns about sharing their intelligence with the United States as well as the possible security holes that exist in Britain’s intelligence network. The letter is really quite interesting because it allows us to gain insight into how British wartime politics actually were. There are countless reports and articles on what was going on, but this letter actually shows us how things were behind the scenes. Additionally interesting with the letter is that is corroborates many of the sources we have already found when it discusses the issues with intelligence sharing. Other sources make comments about how sharing intelligence meant leaving the British intelligence network vulnerable and within this letter we can see Britain’s leaders voice this concern themselves, this tells us that this was a quite serious concern of the time.

United States. CIA. *Historical Intelligence Documents: From COI to CIG*. CIA, 8 May 2007. Web. 7 Jan. 2013. <https://www.cia.gov/library/center-for-the-study-of-intelligence/kent-csi/vol37no3/html/v37i3a10p\_0001.htm>.

As a primary source, this was a great find. It was published by the CIA, so we know that nothing was tampered with and all of the dates and such are accurate, and it comprised of

Presidential and military orders in regard to the formation and destruction of both the OSS and later CIA. These are incredible primary sources, ranging from Roosevelt telling the public about the OSS to Truman disbanding it. We can use these dates to try to look through old newspaper archives and find the public’s reaction to such events. This may be difficult due to security reasons but if we find some stuff, it’ll help our argument. Overall, this small database by the CIA was really helpful and gave us a very accurate portrayal of how these agencies were started.

United States of America. Signal Security Detachment. N.p.: n.p., n.d. 2002. Web. 9 Sept. 2012.

<http://www.codesandciphers.org.uk/documents/bmbrpt/usbmbrpt.pdf>.

Written by Americans stationed in England, this report gives details of how the Enigma machine is structured and operated as well as how different techniques and machines were used  to decipher messages on the machine. The document first gives details of the complexity of the machine, with its multiple keys, wheels, jacks, and contacts. For those using the Enigma machine, there were a total of 152,418,964,472,775 possible combinations from all of the elements of the machine. This gives insight as to why the Germans were so faithful in the inability of the enemy to break the Enigma code. The report then shifts its attention to a solution to the problem of the many possibilities of the Enigma machine, the British Bombe. The Bombe proved very effective because it mechanized the process that previously had to be done by the workers of Bletchley Park, doing 26 input letters simultaneously. This sped up the process of code breaking drastically and allowed the breaking of the Enigma code to become more efficient.

United States of America. War Department. Military Intelligence Division. *Agreement between British Government Code and Cipher, School and U.S. War*. By Geo V. Strong. Washington: n.p., 1943. National Security Agency, 7 Apr. 2010. Web. 8 Oct. 2012. <http://www.nsa.gov/public\_info/\_files/ukusa/spec\_int\_10jun43.pdf>

Declassified by the NSA in 2010, this secret agreement between the U.S. and Britain regarding “Special Intelligence,” describes the roles of the two countries in gaining and using this intelligence and how they will communicate their information to each other. This agreement was necessary in order to make sure that the information was not leaked out, which would render the ability to break the codes useless, it also gave certain responsibilities to each country, and states that all information gained will be shared between the two countries. Britain was in charge of reading German and Italian codes, while the U.S. was in charge of reading Japanese codes. Also, it stresses the importance of limiting the number of people that are given this information in order to keep its secrecy. The information will be relayed between countries and places by way of liaison officers that will know all of the important decoded information. There is also an appendix in this agreement which states the importance of secrecy and explains how to properly communicate Ultra gained information.

United States. National Security Agency. *American Cryptology during the Cold War; 1945-1989*. N.p., n.d. Web. 23 Mar. 2013. <<http://www.nsa.gov/public_info/_files/gulf_of_tonkin/articles/rel2_american_cryptology.pdf>>

 Declassified as recently as 2006, this NSA document explores CIA and NSA actions during the Cold War. The detail is extraordinary and sometimes overwhelming. It was tough to use much of the information provided, due to the amount of detail and precision about every single action. We emailed the NSA, hoping to get more documents and they kindly sent us this same file in paper form. Although the paper was the same thing as the pdf., it was pretty cool to get something from the NSA. The primary pictures were very interesting to look at. Clearly, this is reputable: after all, it's the NSA. Finding this source was a great accomplishment and we were really happy with it.

*The US 6812 Division Bombe Report Eastcote*. Rep. no. 6812. N.p.: n.p., 1944. Print.

This report is a description of the 6812th Signal Security Detachment in the European Theater of Operations from 1 February 1944 to 7 May 1945. The contents of this report was required to be read and understood by all workers, engineers, and technicians operating the Bombe. This source provides a wealth of early descriptions of the Enigma and Bombe machines and the specific jobs of the operators with regards to the machines. In addition, it contains numerous top secret original sketches and diagrams of the machines, their parts, and their operations.

West, Carol. "Memories of a WAAF Teleprinter Operator at Station X (Bletchley Park)." *BBC News*. BBC, 18 Nov. 2003. Web. 14 Oct. 2012. <http://www.bbc.co.uk/print/history/ww2peopleswar/stories/69/a2060669.shtml>.

In West’s short memoir, she recalls the vast secrecy that was part of life at Bletchley. The secrecy was so great that between one hut and the next, Bletchley Park workers were not allowed to say what they were doing. One memory that she speaks about for quite some time is an outing in which she was stopped by the police and when they asked her where she lived she couldn’t tell them. She had to be taken to a Naval Officer who called a member of Signal Intelligence who called her officer at Bletchley before she was let go, all because no was allowed to share any information. Another very striking point that West makes in her writings is that there was deafening clacking from all of the typewriters going in her hut at Bletchley. She talks about the tremendous amount of paper that her hut turned out and how it was often too loud to think. But her most striking point about the volume is in reference to the war’s end when she says that as soon as the war was declared finished all of the typing simultaneously stopped, leaving behind this great empty silence. This source is good for understanding life at Bletchley as well as the secrecy around everything going on at Bletchley.

West, Carol. "My Years at Bletchley Park – Station X." *WW2 People's War*. BBC, 3 Mar. 2004. Web. 18 Oct. 2012. <<http://www.bbc.co.uk/history/ww2peopleswar/stories/60/a2377460.shtml>>

 Once we hit the jackpot of primary sources, there was no stopping us. Carol West provided a great insight into the inner workings of “Station X” and what it was like. She was one of the earlier workers at Bletchley and she described what it was like when more huts starting being built and more workers began flowing in. Carol also explained how she and her coworkers didn’t realize that they were part of such a large production and how much they were helping the war. Her first-person account of how Bletchley worked gave us great depth to our project. Even some of the non-cryptology related stuff was helpful. For example, did you know that the social life at Bletchley was so boring that they often put on plays for entertainment? That is pretty interesting and made this primary very valuable.

Winterbotham, F. W. *The Ultra Secret*. New York: Harper & Row, 1974.

 Being one of the first people to leak the news of the Ultra mission (and the first whose publication was noticed on a broad scale), F. W. Winterbotham is clearly an important character in the story of the Ultra mission. His original book, *The Ultra Secret*, goes through his entire war experience. With incredible detail, he relays information about everything from the Battle of France in 1940 to sections of the Japanese War. One particularly helpful chapter was about D-Day. He relates how he was called in at 2:00 am, and then how in the midst of the fighting, “Ultra told us that the three German armoured divisions were.” By decoding the German codes, they were able to adjust during the fighting of D-Day which was a large factor in their victory. In his introduction, Winterbotham insists that “it has not been my intention in this book to magnify the part I played in the war effort,” which really means that he is trying to sway the reader into believing that he is a reputable source. Unfortunately, other reviews and sources have said that he underrepresented the Poles and their contribution. But nonetheless, this primary book was extremely articulate and helpful .

*Working With Enigma*. Perf. Gerhard Aherns. *History.co.uk*. History Channel, n.d. Web. 23 Sept. 2012. <http://www.history.co.uk/explore-history/ww2/code-breaking/video.html>.

This video is an interview with Gerhard Aherns, a German veteran that had worked to encode messages on the Enigma machine for the Germans in World War Two. He explains the complexity of the machines and the many steps he had to take in order to correctly encode the message. The German encoding force needed to set the wheels, cross wire the sockets, and type in the words for every sentence they were sending as part of their message. To the Germans working with the machine, it was impossible for the Allies to crack the code, because of the complexity necessary to properly encode and decode the messages themselves.

Secondary Sources

*"28 MARCH 1941 Â– THE BATTLE OF CAPE MATAPAN Seventy Years On Â– WW2 Codebreaker Mavis Batey (nÃ©e Lever) Remembers." Bletchley Park News. BletchleyPark.org.uk, 28 Mar. 2011. Web. 18 Oct. 2012. <http://www.bletchleypark.org.uk/news/docview.rhtm/640012>.*

 At some point in our previous research, someone found a reference to the Battle of Matapan and put it on our list of significant effects from the Ultra mission. Looking back on it, we could not remember exactly why so we sought out another source to clarify. This one more than satisfied our curiosity. Not only did it explain what the Battle of Matapan was, it told us exactly how breaking the enigma code helped win it. This source further clarified our thinking that breaking the code was the specific turning *point* but the aftermath is what really makes it a big deal in history. Afterall, the Battle of Matapan was in 1941, 4 years after the Italian code had been broken. Note that the Italians used the same type of code as the Germans but did not update it as much so breaking the German enigma opened the Allies up to reading the Italian code as well.

Aldrich, Richard. "Allied Code-breakers Co-operate -“ but Not Always." *The Guardian*. Guardian News and Media, 24 June 2010. Web. 22 Mar. 2013. <http://www.guardian.co.uk/world/2010/jun/24/intelligence-sharing-codebreakers-agreement-ukusa>.

 We had read a little about the BRUSA and UKUSA agreements but we were a little confused about Canada's involvement. We had had an interview with a Canadian historian, David O'Keefe, and he had hinted at Canada's importance, but we felt that it needed more research. This article, published in one of Britain's leading newspapers, filled us in. Furthermore, this article was written by Richard Aldrich, a man who wrote a book we had heard of and a professor at Warwick University. We knew he was authoritative because many others had also cited him. This article filled in some holes in our argument and given its authoritativeness, we know that it's reliable.

Ambrose, Stephen. "Eisenhower, the Intelligence Community, and the D-Day Invasion." *Wisconson Magazine of History* (1981): 267-73. *Jstor*. Web. 30 Sept. 2012. <<http://www.jstor.org/stable/4635547>>.

In this article, Stephen Ambrose, the American historian and biographer of Eisenhower, gives details on the involvement of Ultra during D-Day. Ambrose explains how Ultra provided the most central information for Operation Overload - the location of enemy troops. Eisenhower knew where the German divisions were to be places as soon as Rommel knew. This provided him with a perfect reading of the German order of battle. In addition, intelligence regarding how heavily the Germans bought operation Fortitude convinced Eisenhower to continued the ruse past the invasion of Normandy, and caused Hitler to delay a plan to send troops to Normandy in favor of holding them at Calais.

Anderson, Duncan, Dr. "Interview with Dr. Anderson." E-mail interview. 5 Nov. 2012

In this interview we asked some pretty general questions such as “how much of a turning point in the war was the description of the Enigma machine. Dr. Duncan Anderson was helpful however, we had hoped he would go into more detail with the questions. It seems like with his view of the topic, the Allies still would have won but it would have taken a lot longer. The U.S still had the atomic bomb and they would have used it on Germany if they hadn't surrendered.

Anderson, Duncan. "Video." *Ultra on the Frontline*. N.p., n.d. Web. 19 Sept. 2012. <http://www.history.co.uk/explore-history/ww2/code-breaking/video.html?bctid=73450090001>.

 Duncan Anderson, the head of the Department of War studies and Sandhurst describes how the cracking of the Enigma code changed the course of events during WWII, giving the advantage to the allies. He says that although Bletchley park was the most important part of cracking the Enigma code, there were also other lower level people working on cracking it. The whole organization was called Ultra. The first success that Ultra brought to the British was in 1942 was the Battle of Alam El Halfa.

Barratt, John. "Enigma and Ultra - the Cypher War." *Military History Online*. N.p., 15 Dec. 2002. Web. 26 Sept. 2012. <<http://www.militaryhistoryonline.com/wwii/atlantic/enigma.aspx>>.

 Barratt’s article provided us with some new search terms which were extremely helpful, ones that we had not seen before. “ID,” “Room 40,” “Donitz” (wolf pack strategy), “Sigint,” and “Shark” are just a few examples. Barratt focused his article on the German point of view during WWII and why they didn’t suspect that their messages were being read or why they never changed their techniques. He talked in depth about Triton, which helped us understand cahgnes in cryptology after the success of the enigma machine. Intended for professional readers, Barratt explained the enigma and Battle of the Atlantic from the enemy’s point of view, which helped us round out our argument.

Bateman, Gary M. "The Enigma Cipher Machine." *U.S. Army Military Intelligence History: A Sourcebook*. Fort Huachuca, AZ: U.S. Army Intelligence Center and Fort Huachuca, 1995. 177-81. Print.

In this chapter from *U.S. Army Military Intelligence History: A Sourcebook* Gary Bateman does an excellent job discussing the impact of Enigma in World War II and beyond. Bateman cites multiple situations throughout the Second World War in which Enigma was used to great advantage by the Allies. The message that Bateman really puts forth in his chapter is that the Allies cracking of Enigma was a real game changer for the Allies, but it was not their sole advantage. It was delightful to find a source that did not argue a pro-Enigma case to such an extent that the source begins to ignore other successes of the Allies. Additionally Bateman discusses failed uses of Enigma intelligence and places where if the Allies had been just a little bit smarter they could have avoided a tragic defeat. One of the examples that Bateman talks about at length for this subject is the Battle of the Bulge and how Enigma intelligence, if read correctly, could have saved many lives. After his discussion of Enigma’s impact on WWII Bateman also fleetingly talks about the lasting impacts of Enigma. While Bateman recognizes that Enigma continues to have a significant impact on our present day lives, he does not actually go into the specifics of that which was rather frustrating. In the end however, the source does a good job assessing the significance of Enigma.

Bletchley Park Trust. *ENIGMA: Codebreaking and the Second World War*. Rochester: Public Records Office, 2002. Print.

This pamphlet from the Bletchley Park Trust outlines many aspects of both the Enigma cipher and the operations at Bletchley Park. While much of the information was repeated from other sources, the valuable information provided is about the lasting influence of Ultra. After World War II there was a lasting signal intelligence agreement between the United states and Britain that came initially in the BRUSA agreement, but was later expanded upon in the UKUSA agreement in 1947. Because of Ultra, the United States, Britain, Canada, Australia, and New Zealand all entered into an intelligence sharing agreement after World War II. This agreement was so valuable that it was allegedly kept secret from the Prime Minister of Australia until 1973! This source emphasizes the significance of Ultra during the war, but following the war for many years.

"Breaking the German Enigma Cipher in 1932-33, with Jerzy Rózycki and Henryk Zygalski [1-4]." *Polish Contributions to Computing*. Florida Gulf Coast University, n.d. Web. 23 Sept. 2012. <<http://chc60.fgcu.edu/EN/HistoryDetail.aspx?c=1>>.

Florida Gulf Coast University’s article on Polish codebreakers of World War II provides a well researched look into the efforts put forth by the Polish in cracking the German Enigma code. The source gives a general overview of many aspects of Enigma and the Polish, but its real strength comes from its research. The article is little more than two pages long but contains sixteen sources. These sources provide a great weight to the comments that the article makes about Enigma. One of the more striking bits of research included in the article is that there were 310114 possible Enigma configurations. That number is greater than the number of atoms believed to exist in the universe. The article makes additional striking comments citing the decryption of Enigma as one of the greatest scientific advances of the war, placing only the atomic bomb above it. Overall, the source provides a well versed look at the Enigma machine, contributions of the Polish, and significance of both.

"Bletchley's Code-cracking Colossus." *BBC News*. N.p., 02 Feb. 2010. Web. 30 Oct. 2012. <http://news.bbc.co.uk/2/hi/technology/8492762.stm>.

Although the connection between Colossus and Enigma is rather tenuous, this source clarified it and helped us find the words for what we were trying to say. It reiterated facts we had seen regarding mistakes on the part of the Germans and Tommy Flowers’ work on the Enigma machine. Written by BBC, we knew it was reputable and authoritative and because it was saying facts we had read elsewhere, we knew that were accurate. Because this source agreed with our other sources, we felt confident in saying that cracking the enigma machine was a turning point in computers because it helped lead to the world’s first programmable computer.

Brown, Brandy Dawn. "Enigma- German Machine Cipher- "Broken" by Polish Cryptologists."*The Polish Attack on Enimga*. N.p., n.d. Web. 13 Sept. 2012. <http://math.ucsd.edu/~crypto/students/enigma.html>.

This is an article published in 1998 pertaining to the cracking of the Enigma Code by Polish cryptologists. mainly talking about the German-Polish relations, it says how the Polish first started working on the German cypher code in 1927 which had just recently been introduced into the German Military system- The Enigma Code. To decipher the code, they started by using the same setting on the German device which was called Kozaczuk. When one typed out the plain text, it would come out as the coded text and it was the same vice versa- when one typed out the coded text, it would come out as plain text. Marian Rejewski was a Polish cryptologist who, from information he received about the Enigma machine, deducted that the wiring of the rotors was in alphabetical order. The Bombe was created, which would automatically turn the rotors which would go through each combination of letters, and then stop when the rotors were properly aligned. Helping to decipher the codes of the Germans, the Bombe lead to the uncover of their plans.

Burke, Colin, and Deborah Anderson. "The US Bombes, NCR, Joseph Desch, and 600 WAVES: The First Reunion of the US Naval Computing Machine Laboratory." N.p., n.d. Web. <http://www.thecorememory.com/WAVES.pdf>

This is a book written by one of the codebreakers at Bletchley Park, which talks about the operation at Bletchley park called Ultra which was only revealed in 1968. Even though there were a couple people stationed at BP (Bletchley Park) from the U.S. , the Americans did not have that big a role in the Ultra Secret and focused more on Japan rather than Germany. The way  that the Allies were able to break the codes of the Enigma was when the Germans made errors in their message sendings. The errors would lead to cribs. Cribs in England, would be when a kid in school would look over their shoulder at another student to get the information they needed. One example of a crib was when the same message was sent many times using different codes. The Bombes, would look for patterns and ignore certain sequences of characters to eliminate some of the probable solutions.

Bury, Jan. "Enigma: The Secret Weapon of WWII" *The Enigma*. Polish American Journal, Oct. 1990. Web. 04 Jan. 2013. <<http://www.polamjournal.com/Library/APHistory/enigma/enigma.html>>.

 We used this newspaper article to help us gain insight into the Poles’ contributions to the British effort of cracking the enigma code. This article, written in 1990, provided great details on exactly how the Poles managed to find the code decades before it was widely used and somehow knew that it would become widely used. Although this wasn’t a primary source, we had already read an article by Jan Bury and knew it was a good source. All of the information was accurate and made sense, and helped our argument progress.

Bury, Jan. "The Greatest Secret of World War II - The Enigma Code Breach." *THE ENIGMA - A POLISH VIEW*. N.p., n.d. Web. 28 Sept. 2012. <http://web.archive.org/web/20040414113128/http://webhome.idirect.com/~jproc/crypto/enigs1.html>.

 Bury started the article by stating that the Polish’s help in solving the Enigma machine is always understated and goes on to explain their exact significance. Bury carefully goes through the war and explains how the enigma machine plays an important role in each battle and front. Bury even finished with a new thought that we hadn’t heard before, the idea that the enigma was so strong and revolutionary that it was good enough to be incorporated into the Unix Operating System which was developed in the late 1960's. Bury only listed a handful of sources but after looking over them carefully, we realized that every single one was primary and extremely useful. Bury used some of the original Poles’ notes and articles which makes the article very strong and authoritative.

Carter, Frank. "From Bombe 'stops' to Enigma Keys." (n.d.): n. pag. Bletchley Park Organization. Web. 8 Oct. 2012.

Carter outlines the general functionality of the bombe in this essay. Carter foregoes the high level explanation and chooses instead to delve into the more complicated inner mechanical workings and mathematics behind the bombe. What was important from the essay in terms of our project is Carter’s explanation of the enormity of the task of calculating possible Enigma settings. In one of Carter’s particularly striking examples, he mentions that a common “crib” for the bombe could generate 2373 possible results of which only one is correct. This information is incredibly valuable to us because it helps to put the entire codebreaking operation in perspective. One can understand why Bletchley Park has such a huge significance in World War II history when they understand that the task of cracking Enigma was nigh impossible.

Ceruzzi, Paul. "Decryption Day by Day." Rev. of *Codebreakers. The Inside Story at Bletchley Park*. n.d.: n. pag. Print.

Describing the details of Bletchley Park, this review tells how the workers of Bletchley park were sworn to an oath that was only recently lifted about 15 years ago. The book, *The Inside Story at Bletchley Park* includes a compilation of the information of 29 people who worked at Bletchley Park. It was also very interesting how of the people which were brought to Bletchley Park, many of them were from Cambridge. They were trained in mathematics but would also be selected for their skills in crossword puzzles or chess.

Chapman, Mike J. E-mail interview. mike.j.chapman@gmail.com. 1 Nov. 2012.

 Mike Chapman works at Bletchley Park and contacted us in response to our email just a few short hours after we sent it. We sent a comment to the forum on bletchleypark.org.uk and it appears that his name was sent to us. He is a volunteer tour guide there and from our short email correspondence, seems very knowledgeable. His response blew us away. He put incredible amounts of thought and effort into every single question we asked and even asked clarifying questions to make sure that he was answering our question, not something else. By asking these questions, he helped us formulate better questions for later interviews and the information he provided really helped us narrow our topic. He opened up a whole new aspect of the topic we had not considered (the industrial aspect of Bletchley) and with the edits to our thesis, Mr. Chapman quickly gained our respect. He ended the interview with a poem from one of the workers and embedded within it were many great quotes. Although Mr. Chapman is just a tour guide, his obvious love for the subject proved that he had done his research and knew what he was talking about.

Cochran, Alexander S. ""MAGIC," "ULTRA," and the Second World War: Literature, Sources, and Outlook." *Miltary Affairs* 46.2 (1982): 88-92. *JSTOR*. Web. 6 Oct. 2012. <http://www.jstor.org/stable/1988118>.

 Cochran started his article by talking about David Kahn, which immediately made it look reliable. He rebutted Kahn, and proceeded to make a well-formulated argument. Cochran told us about a new source, one we hadn’t heard of being, that was published in the early 1960’s by Montgomery Hyde. He talked about Winterbotham’s publication, which we had already requested from the library. He also introduced three more important books, ones we had not heard of before. At the end of the article, there was a three page “reference” list which we took some time to dig through. This article didn’t explicitly give us information on the Enigma machine but it helped us figure out where to search next for primary sources.

"Code Breaking." *History*. UK History Channel, n.d. Web. 09 Sept. 2012. <http://www.history.co.uk/explore-history/ww2/code-breaking.html>.

Published on the UK History channel, this article gives a good overview of the Enigma machine and its importance to World War Two and can be considered a reliable source. It states that the Enigma machine was used by typing in a message to the typewriter-like machine, and then scrambling the letters into a code. The receiver of this message could only decode it if they knew where the wheels of the machine were when the message was encoded. This source also gives clear information on how the Allies tried to conceal the fact that they had broken the code, in order to maximize the importance of the code. It also talks about the changes the Germans made to the machine after suspecting that the Allies had broken their code.

*Codes in the American Civil War*. Jones e-Global Library, 14 Mar. 12. Web. 15 Nov. 2012. <http://www.youtube.com/watch?v=sLWr7UuCF0A>.

Jones e-Global library is a resource for home schooled students, making it a very reliable video with pertinent information. This video focused on the codes used during the American Civil War. This was helpful to our topic of Enigma during World War II because it showed us what cryptology was like in the nineteenth century. It was during the Civil War that cryptology was first taken seriously as a military tactic during wartime. This was because during the Battle of Bull Run the Confederacy was able to gain Union war plans which allowed them to decisively win the battle.

Cooke, Frank. "The Enigma Decoder Operation Primrose and Arnold Hargreaves His Part in Hitlers Downfall." *The Enigma Decoder Operation Primrose and Arnold Hargreaves His Part in Hitlers Downfall*. N.p., n.d. Web. 16 Sept. 2012. <http://www.goldonian.org/mem\_sub\_pages/jim\_hargreaves.htm>.

 Written by Frank Cooke, this was an account of his research of Able Seaman Arnold Hargreaves and how he played a part in stopping Hitler’s role in WWII. It helped us find other sources and gave us names such as Alan Turing, Able Seaman Arnold Hargreaves, and Fritz-Julius Lemp as well as giving the link to a primary source letter that was sent by David Balme, the leader of the capture of the enigma machine. It talks about how right before the Enigma code was captured, the English were severely losing against the Germans with only had two more weeks worth of food to feed the population on. Some people wondered if England’s  leaders were about to surrender to the Germans and the only reason they didn’t could have been because they had the lucky mishap of stumbling upon, and capturing the Enigma code on the U-110 by the Bulldog(English ship).

Copeland, Jack, and Diane Proudfoot. "What Turing Did after He Invented the Universal Turing Machine." *Journal of Logic, Language, and Information* (n.d.): n. pag. Web.

 A scholarly journal, this article, talks mostly about Alan Turing and his inventions over the years. It seems that Alan Turing was fluent in the language of computers with all that  he has accomplished. While turing worked on the Enigma machine, Newman, another mathematician just as capable as Turing, worked on Fish, which was another code machine used during WWII. THis journal also gave us the  name Tom Flowers who worked to build the Colossus along with Newman. Wittgenstein also was someone who Turing learned from as he went to his seminars.

"Copy of Secret Document from World War II given to NARA." *New Books: Bletchley Park Visitors' Book*. N.p., n.d. Web. 14 Oct. 2012. <http://www.archives.gov/research/alic/reference/military/bletchley-park-visitors-book.html>

This article from the National archives website has more details of the Bletchley park operations. Bletchley park was Britain’s secret, however, within bletchley Park, there was another secret. This was the Hut 11. Hut 11 housed five different Bombes, all being used to crack the Enigma code. The Bombes first went into use in spring of 1940. Only certain people, after being identified by another person, were allowed inside to visit Hut 11. A signature was required and the document is still around, of the different people who went into ut 11 to work with the Bombes.

"D-DAY: JUNE 6, 1944." *The National WWII Museum*. Convio, 2000. Web. 26 Sept. 2012. <http://www.nationalww2museum.org/learn/education/for-students/ww2-history/d-day-june-6-1944.html>.

 Over and over, we have been hearing mentions of how enigma helped D-Day succeed but we have been unable to find a comprehensive source that explicitly explained why. Finally, this source popped up and although it was 85% about D-Day in general, there was a very helpful section about the enigma machine. We finally understood why the enigma helped for the storming of Normandy. With the use of Ultra intelligence, the Allies were able to ensure that the Germans had fallen for their leaks of false information and were not going to move forces around to protect the coast of Normandy. This source was reliable because it was published by The National WWII Museum. Although it was intended for students, not professional readers, it filled a gap in our timeline which was very helpful.

Dalh, Dijkstra, and Nygaard. "Scherbius' Enigma." *Virtual Exhibitions in Informatics*. Universitat Klagenfurt, 2004. Web. 26 Sept. 2012. <http://cs-exhibitions.uni-klu.ac.at/index.php?id=282>.

 Most articles focus on key players like Alan Turing or Bletchley Park but this one described, in detail, Arthur Scherbius and the creation of the first enigma machine. Dalh, Dijkstra, and Nygaard slowly went through each design of the enigma and how it changed. Their description gave us new search terms like Model A, B, and C, and the Polish cypher office called Buiro Szyfrow. Another fun fact we learned was that “Enigma” is the Greek word for “riddle.” We thought that was kind of cool. Learning how the enigma machine was invented helped us really understand how revolutionary it was for the science of cryptology.

Deutsch, Harold C. "Influence of Ultra on World War II." N.p., 1978. Web. 9 Sept. 2012. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA512228>

Written by Harold C. Deutsch, a professor of military history at U.S. Army Military Institute, this essay gave us information on the impact of Ultra gained intelligence. Deutsch believes that the most important use of Ultra was for deception. Ultra also allowed the British to take control of and manipulate the German espionage system, which mislead the axis powers many times during the war. Ultra was also important in air warfare and the attacks on Germany and gave the Allies information on the damage they had inflicted on the Germans. Ultra also gave the Allies inside information about when the Germans and other Axis powers shifted their focus to different parts of the war.

"Double Cross System." Princeton, n.d. Web. 18 Oct. 2012. <http://www.princeton.edu/~achaney/tmve/wiki100k/docs/Double\_Cross\_System.html>.

Published by princeton.edu, we knew from first glance that this source would be helpful. We were confused as to what the Double Cross system was and this certainly helped clear it up. We had seen it referenced in regards to D-Day but never in depth. It explained how MI5, the British Intelligence Agency, used this to help storm the Battle of Normandy and eventually win the war. They used the Double Cross System (also known as XX) to do acts of anti-espionage to confuse the enemy and use spies to their advantage. While this source did not really footnote its sources, it provided an interesting view of a specific part of WWII. Like the North African Campaign, this will not be the focus of our project but it is certainly a supplementary idea that solidifies how big of a turning point breaking the enigma was.

"Early Electronic Computers (1946-51)." *Early Computers (1946-51)*. University of Machester, n.d. Web. 14 Oct. 2012. <http://www.computer50.org/mark1/contemporary.html>.

This article details the exact of effects Ultra had on the evolution of the modern day computer. It concludes that while Colossus had little direct impact because it was secret information, but had an impact on the lives of many of the Bletchley Park workers who would go on to help pioneer the computers. More specifically, Alan Turing, who was a consultant for Colossus began a project to capitalize on the potential for a general-purpose computer for the National Physical Laboratory. Max Newman and eventually Turing as well went to work for the University of Manchester, where they both contributed to early computer models there.

"Enigma." *Enigma*. Crypto Museum, n.d. Web. 08 Oct. 2012. <http://www.cryptomuseum.com/crypto/enigma/working.htm>.

This detailed description of the structure of Enigma machines is provided by the Crypto Museum acknowledges the many variations of the machine and pulls the many descriptions of different aspects into a cohesive whole. Different Enigmas function differently due to variations in the Steckerbrett, ETW mapping, numbers vs letters, number of wheels, UKW mapping, wheel wiring, number of notches, and single or double stepping. The article is particularly significant in its clear description of double-stepping and how specific permutations result in the number of possible Enigma settings.

"Enigma Machine and Its U-boat Codes." *U-110 CAPTURED*. N.p., n.d. Web. 13 Sept. 2012. <http://www.awesomestories.com/history/u571/u-110-captured>.

This website tells the event of the first capture of the Enigma Code in the German U-Boat, U-110. It has some very good primary source quotes from the leader of the capturing, David Balme, and what he was thinking during this attack. Including many details about the capture, which was called “Operation Primrose”. The story talks about the condition that David Balm found the Enigma Machine in and how it was still plugged in with even the code books still intact. From David Balme, it was sent to Bletchley Park where the the mathematician Alan Turing would work to break it. The decoding method that Turing’s team was to make would be called the Turing Bombe. Within the text, links were posted as a way of citing the sources which proved to very helpful in finding a few primary sources.

Erksine, Ralph. "Enigma." *Uboat.net*. N.p., n.d. Web. 23 Sept. 2012. <http://uboat.net/technical/enigma\_breaking.htm>.

This article gives greater detail on the process of decoding the U-boat Enigmas, and broad effects that had on the war effort. Erkstine explains how the decrypting of naval Enigmas relied heavily on the use of naval codes for cribs, which had to be captured. In addition, this article explains that intelligence from the decrypts allowed the Operational Intelligence Center to reroute convoys which saved hundreds of thousands of vital shipping. Using the Enigma information, the Allies were able to establish Atlantic supremacy as early as 1941, without which it is unlikely they would have been able to do until 1943. This in turn, would have prolonged the entire war.

ESourceVideo. "BBC: Code Breakers Bletchley Parks Lost Heroes." *YouTube*. BBC, 25 Nov. 2011. Web. 22 Sept. 2012. <http://www.youtube.com/watch?v=JF48sl15OCg>

 This helpful film came up and after watching it, we decided it was absolutely one of our most helpful sources yet. It had some cool animation that gave us some ideas and throughout the one hour documentary, many historians and actual Bletchley Park workers spoke. One of them, Captain Jerry Roberts is one of the last surviving high-rank workers at Bletchley and would definitely be a good interviewee. This documentary gave us a perfect quote; “Bletchley is Britain’s fortress of secrets,” which may be able to be worked into our project somehow. We were further informed of how secretive Bletchley was (it didn’t even appear on maps!) and we understand why it was so useful (radio became the main form of communication). We realized that since enigma was the first to successfully break the code, it wasn’t perfect and led the way to more advanced technology in the field of cryptology which ties in perfectly with our thesis. This documentary was extremely helpful and we know that YouTube will be another research destination soon!

"Evolution of U.S. Intelligence." *Intelligence and Counterintelligence*. New American Nation, n.d. Web. 07 Jan. 2013.

 Once we were sure that we were going to pursue the facet of long term intelligence effects, this article became extremely helpful. It walked us through the United States’ intelligence history, from the Revolutionary War in 1775 to very recent events from 2001. We used the terms and people mentioned in this article to do  more authoritative research in order to find quotes and such that would actually go on the website. Some of the information in this article wasn’t relevant, but it showed how much impact the CIA has had in the past few decades and we were able to make the connection that this all started in WWII after seeing the success of Bletchley Park.

Finnegan, John. P. "U.S. Army Signals Intelligence in World War II: An Overview." *U.S. Army Military Intelligence History: A Sourcebook*. Fort Huachuca, AZ: U.S. Army Intelligence Center and Fort Huachuca, 1995. 170-76. Print.

In this chapter of *U.S. Army Military Intelligence History: A Sourcebook* Finnegan analyzes the development of American intelligence operations during World War II. Finnegan starts his analyses at the start of World War II, immediately citing the lack of intelligence operations in the U.S. army. This point was particularly interesting to read about because today America is credited as having the best intelligence operations worldwide. Finnegan continues his analyses of intelligence development throughout the war citing a few interesting points along the way, but the lasting message of his analyses is that the US was not ready for the intelligence demands of World War II. After reading about the number of times that US intelligence organizations had to be restructured, consolidated, formed, and disbanded it becomes excessively clear that the US was in no position to fight an intelligence battle at the start of WWII. A point made by Finnegan that is particularly strong to our case is that the British development of their own intelligence operations spurred on American intelligence operations. This point demonstrates the significance of Enigma on a larger scale past World War II.

Gilman, Larry. "Enigma." *World History In Context*

*<*http://www.faqs.org/espionage/Ec-Ep/Enigma.html*>*

In this context source, Larry Gilman gives an overview of what the Enigma code was. It was first used by the Germans from 1926 until the end of WWII. He also talked about how the Japanese used a similar machine in the WWII and this one too, was cracked by the Allies. The cracking of the code proved crucial to the allied victory at the battle of Midway. During WWI, mathematicians started to envelop themselves in discovering ways to code secret messages with paper and pencil. Later in the 20th century they began to look at ways to scramble letters randomly using machines. In 1918, Arthur Scherbius created a cipher machine that he named Enigma. The machine used a 26- character alphabet and had four rotor disks which would be set everyday at midnight, using a new key. Each key had their own code book that the operator used to decipher the message. The Germans gave it to the French who thought it would be unbreakable no matter what, and gave it to the Polish. The Polish then were able to break the code and conspired with the Allies to bring down the Axis.

Heath, Nick. "Britain’s World War II Codebreakers Tell Their Story." *Britain’s World War II Codebreakers Tell Their Story*. TechRepublic, 15 Mar. 2012. Web. 04 Nov. 2012. <http://www.techrepublic.com/blog/european-technology/britains-world-war-ii-codebreakers-tell-their-story/298>.

In the process of trying to secure an interview with one of the original Bletchley Park workers, we stumbled across Nick Heath and his article. He explained the connection with Captain Jerry Roberts and Tunny’s importance, especially compared to Enigma. We found a great statistic (“once naval enigma was broken, the sinkings dropped by 75 percent”) and if we can find something real and concrete to back that up, that would be a great addition to our website. This normal article turned out to be quite useful and pointed us in a good direction for further research to help our website become even stronger.

Henderson, Harry. *Alan Turing: Computing Genius and Wartime Code Breaker*. New York, NY: Chelsea House, 2011.

 Although this book was not intended for high level, professional readers, it went quite in depth about Alan Turing and his influence on the enigma machine. Henderson’s book was part of a larger series that focused on famous and influential scientists so the main goal of the book was to educate the reader about Turing’s life. There was a significant chapter about the enigma, which we read thoroughly, but we mostly skimmed the rest of the book which discussed Turing’s childhood and things he did after working at Bletchley. One helpful bit, however, was Henderson’s mention of a letter Turing personally wrote to Churchill. That seems like it would make a great primary source and would add significant depth to our project. We immediately decided to find it next.

Historical Publications - How Mathematicians Helped Win WWII."  National Security Agency,

n.d. Web. 11 Sept. 2012.

<<http://www.nsa.gov/about/cryptologic_heritage/center_crypt_history/publications/how_math_helped_win.shtml>>.

This National Security Agency article detailing the life of the Enigma machine is brief but exceedingly helpful. The source provides both the significance of the Enigma code as well as the historical context of Enigma. In addition, the source holds great authority as it is a document produced by a government agency. The NSA publication discusses the reason for developing Enigma, the decryption of Enigma, and the uses of Enigma’s decryption and how all of these things resulted in various moments in WWII. In the discussion of significance the article also does a good job at detailing the historical events that were running in parallel to the events surrounding Enigma, thus providing historical context. After reading this source we now understand why the development of Enigma was both an offensive and reactionary measure taken by the Germans and that Enigma’s roots are planted firmly in WWI. Additionally we understand how Enigma’s decryption drastically shaped post-WWII encryption.

"History of the Central Intelligence Agency." *FAS.org*. Federation of American Scientists, n.d.

Web. 21 Oct. 2012. <http://www.fas.org/irp/cia/ciahist.htm>.

The Federation of American Scientists talks about the start of the OSS, CIG, and CIA in this article about the history of the CIA. This article confirms what other articles have said about the troubled beginnings of American intelligence operations. The article talks at length about the troubled period in American intelligence immediately following World War II. The American people as well as the president did not want an intelligence agency, but with the Cold War ramping up in 1947 the value of intelligence was quickly realized. It was interesting reading about the time period from 1945-47 because it was clear that the United States intelligence operations did not know what to do with themselves. The OSS had been disbanded at the end of the war, but then the CIG was formed a few months later, and then a few months after that the CIG was disbanded and the CIA formed. Another interesting thing brought up in this article is how the CIA has steadily grown more and more secretive as time goes on. In some ways this is a lasting impact of cracking Enigma. Because the CIA knows how even the most “uncrackable” codes can falter they have developed the most secretive methods imaginable. This piece does a good job evaluating the impact of the CIA as well as the history of it.

Horne, Charles F. "The Zimmermann Telegram." *First World War.com*. N.p., 22 Aug. 2009. Web. 11 Jan. 2013. <<http://www.firstworldwar.com/features/zimmermann.htm>>

 In our past research, we had read plenty about the straight facts of the Zimmermann Telegram but this article offered a new perspective It told us what Americans thought about the incident and although it wasn’t a primary source, it seemed to nicely generalize about American opinions. Furthermore, Horne delved into the psychological effects of the Zimmermann telegram and we have been researching a parallel subject with enigma psychological warfare. It showed the use of intelligence and cryptology before enigma, which helped us develop our turning point argument.

Info Poland. “Enigma Time-line. A short history of the breaking of the code” *University at Buffalo, State University of New York.* 28 Sept. 2012. <http://info-poland.buffalo.edu/web/history/WWII/enigma/tl/link.shtml>

After reading this short article and timeline, we learned some new very important information. We had never thought of who originally started trying to break the code in Poland but this article informed us that it was the High Command of the Polish Armed Forces, in 1929. There was quite a bit of very specific information about the Enigma on the Polish side, which is very helpful in understanding the Enigma that the British worked with. Because it was sponsored by the University at Buffalo, we know that they published this for education’s sake, not to earn money, which helps its authoritativeness.

"ISOS and ISK Series Reports." *Archival Collections*. N.p., n.d. Web. 30 Sept. 2012. <http://www.bletchleypark.org.uk/edu/archives/isoscoll.rhtm>.

This article published in the British National Archives regarding the ISOS (Abwehr radio decrypts) and IKS (Abwehr Enigma decrypts) series reports. Most significantly, the article explains how these Abwehr decrypts were "largely responsible" for controlling the German spy network in the country. It allowed them to keep track of turned double agents where-ever they traveled, and determine new agents entering the country. In particular, this allowed the Allies to confirm that the Germans had completely fallen for the evidence planted by double agents regarding the landing at Normandy during D-day. Double agents, in turn, provided cribs in radio messages that were vital to breaking the Abwehr Enigma.

Jing-Jing, Cai. "A Study of the National Security Act of 1947."  Jilin University, n.d. Abstract. N.p., n.d. Web. 8 Jan. 2013

 Most of our sources have been either British or American so finding a paper by a university in China was very refreshing. It analyzed the National Security Act of 1947 and because it is an outside country looking in, it offers an interesting bias and international opinion. Furthermore, this study provided key facts about the National Security Act and what led to it and how it was received. We did a ton of back research on the university and the author to try to figure out how authoritative they are and to our best knowledge, Cai Jing-Jing is a professor of some sorts and this university looks legitimate so we decided it was a safe source to use. Through much interpretation, this paper became very helpful in critiquing our argument.

Kahn, David. "Codebreaking and the Battle of the Atlantic." Lecture. USAFA Harmon Memorial Lecture #36. 4 Apr. 1994. Web. 14 Oct. 2012. <http://www.usafa.edu/df/dfh/docs/Harmon36.pdf>.

 We thought we had fully exhausted the David Kahn sources but here popped another! We were still trying to figure out what happened in the Munich conference in 1978 and this appeared on Google Scholar. As soon as we saw the author, we knew it would be a good source. This lecture, which takes the form of an essay, gave us insightful details on the whole Ultra mission. Unfortunately, it only had a quick blurb about the conference but at least it was a start. However, the article started at the beginning of the enigma machine project and worked its way through the history. This gave us more details on explicit events, which we decided to research next. Like always, David Kahn did not fail to disappoint and this lecture was a helpful find.

Kahn, David. "Codebreaking in World Wars I and II: The Major Successes and Failures, Their Causes and Their Effects." *The Historical Journal* 23.3 (1980): 617-39.*JSTOR*. Cambridge University Press. Web. 18 Sept. 2012. <http:///www.jstor.org/stable/2638994>.

 After the first few pages, we considered throwing this article out. It seemed to be solely focused on World War I, which is not our topic. It didn’t even seem helpful as a context source. But once we hit the section on WWII, we realized this may be one of our most helpful sources. The extensive footnotes and citations (which also provided assurance of its reliability) gave us ideas for many more sources to track down, sources that we knew would be dependable and meant for a professional reader. Kahn’s in depth description of the entire machine were incredibly helpful. We were also exposed to new insight into the Allies’ codes and why they were able to win on the cryptology front. David Kahn seems to be an expert on the enigma machine and will definitely be someone we will try to interview. This source was a very good find and helped us decide where to research next.

Kahn, David. "Cryptology Goes Public." *Foreign Affairs* 58.1 (1979): 141-59. *JSTOR*. Council on Foreign Relations. Web. 18 Sept. 2012. <http://www.jstor.org/stable/20040343>.

 Like all David Kahn sources, this one was unbelievably helpful. It focused on cryptology, not just the Ultra mission which helped us understand more why the success of the Enigma was so revolutionary. The first two pages clued us into an event we had not researched thoroughly; the conference in 1978 where the Allies discussed with the Germans their secret intelligence. After delving into that bit of critical information, Kahn stepped back and explained some basic terms of cryptology and how an enigma machine worked. He explained why the Germans thought it was completely unbreakable and mentioned many names of high rank officials, which we decided to try to research next. As a certainly reputable source, David Kahn provided us with a deeper understanding and helped us further understand how much the enigma machine helped win WWII.

Kahn, David. "Enigma Unwrapped: The Ultra Secret." *New York Times*. N.p., 29 Dec. 1974.

Web. 27 Sept. 2012.

This book review by David Kahn, a renowned historian of cryptography, contains some broad details of the contributions of Enigma codes to the Battle of Britain, the Battle of the Atlantic, the Campaigns in North Africa, and sheer number of German casualties in Normandy. However, the article is most significant in its mention of the machines following the wars. Here it explains how tens of thousands of Enigma machines were sold by Britain to developing countries, under the pretence that the codes were still completely secure. Kahn suggests this is the reason the success of Ultra was not revealed until the 70s, it allowed the British and Americans full access to any encoded message by these countries. Many of the countries continued to use Enigmas as their source of cryptography for approximately the next twenty years.

Kahn, David. "How the Allies Suppressed the Second Greatest Secret of World War II\*." *Journal of Military History* 4(2010):1229. *eLibrary*. Web. 26 Sep. 2012.

 David Kahn has quickly become our favorite author. He is referenced by many other sources and has written many articles about the enigma machine and Ultra mission. This specific article helped drive home the idea of how secret the entire mission was. There was a list of all the people that leaked information about the enigma before it was officially released to the public. We plan to find as many of those records as we can, at least the ones that are in English. Furthermore, Kahn talked about *The Ultra Secret* which is a book written by Group Captain F W Winterbotham (we also read his obituary) in 1974. That book was the first noticed public announcement of the mission and made a huge splash. We quickly decided to find it next. Like always, David Kahn was extremely helpful and a very good source

Kahn, David. "The International Conference on Ultra." Military Affairs 43.2 (1979): 97-98.

Society for Military History. Web. 26 Sept. 2012.

Kahn’s journal article summarizing the discussion at the International Conference on Ultra proves to be highly valuable in understanding the impact of Ultra. Kahn pulls out the highlight of the conference and presents them in an easy to understand manner. What was most interesting about the article, or more accurately the conference, is that the discussion of Ultra was taking place between German historians and scholars as well as English and American scholars. Both sides managed to come to a consensus about the significant impact of Ultra as well as the importance of cracking the Enigma code. Even more fascinating to discover in the article was the German perspective on the entire situation. The German historians wholeheartedly agreed that Britain’s Ultra division was one of the most important aspects of the war and that cracking Enigma was a major turning point.

Kahn, David. Telephone interview. 6 Nov. 2012.

As is obvious from our annotated bibliography, we are huge fans of David Kahn and when he replied to our email and agreed to do an interview, one can easily picture our excitement. We were only on the phone with him for half an hour or so but during that time, we were able to get many of our questions answered. He has an incredible amount of knowledge and seemingly pulled it out of nowhere, yet all of it made perfect sense and applied to our question. He agreed with many of our points and even offered further depth into some where we were a little more confused. For the second time, we heard the idea of an industrial Bletchley Park suggested and that further cemented the idea of adding it to our argument (Mike Chapman being the first to suggest it). Getting an interview with one of the leading experts on our topic was huge and we were thrilled to have such an amazing opportunity.

Kemble, Mike. "Enigma - The Truth." *The Enigma Code Machine*. N.p., 12 May 2012. Web. 14 Oct. 2012. <http://www.secondworldwar.org.uk/enigma.html>.

We found this source when searching for more information about “dolphin enigma WWII” but soon realized that this was much more in depth than we originally thought. There was all the expected information about the enigma (Alan Turing, the U-Boats, all that good stuff) but it also went more into detail about things like Colossus (which had its’ own link) and what it is like to actually visit Bletchley Park. We followed the extensive web of links on his works cited to find more sources, and were not disappointed. This source, although not written by a professional historian, is written by a guy who really likes history. He has also written at least one book and as we maneuvered around this site trying to find information for the citation, we realized it was much broader than we had originally expected. He has articles about tons of WWII events, and all of them seem well researched and written. He has no reason to lie, making this a very reputable source.

Kippenhahn, Rudolf. *Code Breaking: A History and Exploration*. Translated by Ewald Osers. Woodstock, NY: Overlook, 1999.

 A wonderfully in depth source, this book led us through each aspect of code breaking from the early beginnings of codes all the way to when the book was written, which was late nineteen nineties. We focused on the middle two chapters that were about the enigma. One dealt with Rejewski and the Poles’ help with the machine, and another in depth section focused on Winterbotham and his influence. Overall, the book gave us wonderful insight into the in depth happenings of code breaking in general and helped us see how important the enigma was. This could probably be considered a context source and the author is very reputable. Kippenhahn was a professor at the University of Gottingen (Germany) and has made quite a name for himself in the literary world.

Kozaczuk, Władysław. *Enigma: How the German Machine Cipher Was Broken, and How It Was Read by the Allies in World War Two*. [Frederick, Md.]: University Publications of America, 1984.

 Footnotes and serious notes are always a good sign of a professional source and Kozaczuk’s book certainly fit the bill for that. There were pages upon pages of notes after each chapter, all of whom pointed the way for more research. The book went deep into the nuts and bolts of the entire mission, including how the enigma machine actually worked. Most of the sources we’ve read have explained how the machine has worked but this one went into much greater detail. It mostly focused on the enigma’s effect during the war, but failed to mention how it was a turning point in other areas like cryptology. But for a war book, this one was a great find. The author has been mentioned before and has even written other books on the same subject so we were reasonably confident that he was reliable and authoritative.

Lewin, Ronald. "A Signal-Intelligence War." Journal of Contemporary History 16.3 (1981): 501-12. JStor. Sage Publications Ltd. Web. 26 Sept. 2012.

Lewin’s article gives insight into not only the British code breaking operations, but also the American ones. Lewin discusses the impact of British code breaking operations, but also states that American code breaking efforts are underappreciated because “Ultra” operations came to encompass all Allied cryptanalytic operations during World War II. The source was somewhat helpful in understanding the significance of Ultra, but its real importance to our research came in its discussion of Ultra’s magnitude. We now understand that we are not researching Ultra specifically enough and really need to focus on the Enigma side of things. This source is the kind that is less helpful in actual understanding of the subject, but very helpful in thesis development.

Lewin, Ronald. *Ultra Goes to War: The First Account of World War II's Greatest Secret Based on Official Documents*. New York: McGraw-Hill, 1978. Print.

 Lewin claims that his book is the first account *based* on official documents, which is great for us. It has some hindsight with official sources to back it up, but there were also plenty of survivors left who could provide firsthand accounts. Unlike Winterbotham’s book, this one is much more reliable. One part that particularly struck us was the dedication; “To the Poles who sowed the seed and to those who reaped the harvest.” This was Lewin’s attempt to make up for Winterbotham’s lack of mentioning them, which we really liked. Lewin had information about all the things we’ve heard about and researched, from Station X to D-Day. Lewin has been mentioned by all sorts of authors and publishers, from David Kahn to History.com. We knew that he is a reputable source because his name is mentioned so many times. Like many books on this subject, Lewin’s was incredibly detailed and made very astute connections, all of which has helped us and will continue to help us shape our argument of how cracking the enigma code was a turning point.

"Machines behind the Codes." *Bletchley Park : The Machines*. National Codes Center, n.d. Web.

09 Sept. 2012. <http://www.bletchleypark.org.uk/content/machines.rhtm>.

This explanation posted by the official Bletchley Park website gives a great deal of insight into the four major machines involved in the decryption process at Bletchley Park during the war. Given that the article is published by a museum, it gives an extremely authoritative overview of the general mechanics and uses of the Enigma machine, the Bombe machine, the Lorenz and the Colossus. Because the Lorenz was far more complex than the Enigma machine, using five electrical pulses to represent letters and enciphering by adding a series of randomly generated letters determined by rotors to the original text, the Colossus had to be equally complex. This article explains that not only did the Colossus’ success at decoding messages factor hugely into the war, but in addition it was the world’s first practical electronic digital information processing machine - setting the stage for the modern computer.

Maslin, Janet. "BOOKS OF THE TIMES." Rev. of *The Agents Who Fooled the Nazis About D-Day*, by Ben Macintyre. *The New York Times* 8 Aug. 2012, C1 sec.: n. pag. Print.

 In the process of trying to find more information on the double cross system, we came across this book review in the New York Times. Ben Macintyre’s name looked familiar and with a quick search in our annotated bibliography, we realized that we had once again stumbled across the same man as before. We immediately decided to look for his books and potentially try to interview him soon. But before that, we actually read the article. It praised him, calling him the “reigning champ” of anything related to World War II spy stories and by reading the review, we learned some helpful facts about the double cross system. Background about Mr. Macintyre was provided, which will help us if we do secure an interview with him. However, the reviewer focused greatly on the excess of information that Mr. Macintyre provided, which made it feel more like a edit of the book, rather than an analytical review. Nonetheless, this was extremely helpful and we found our next interview target!

Masterman, John Cecil. *The Double-cross System the Incredible True Story of How Nazi Spies Were Turned into Double Agents*. New York, NY: Lyons, 2000. Print.

When we first started making our argument overview, we realized that we had a giant hole in our argument around D-Day and how the double-cross system worked. We immediately set out to do more research and came across Masterman’s book, which turned out to be very helpful. He defined what the double-cross system was and explained how it helped the Allies pull the invasion of Normandy off successfully. We had been really confused as to exactly how this worked but Masterman explained it in great depth. We have seen this book referenced in quite a few secondary websites so we are fairly confident that it is reliable and authoritative. Although it is not primary, this book was still helpful and well worth the time it took to find it and thumb through it.

*Mavis Batey*. Perf. Kate Ade. Rusi Online, n.d. Web. 9 Dec. 2012. <http://www.youtube.com/watch?v=gfwVtpa0nS4>.

Spoken by Kate Adie, a BBC news correspondent, this key-note address written by Mavis Batey gives great insight into the work done by Bletchley Park. It talks about how little knowledge of Enigma was required by the workers for them to start trying to break Enigma messages. It also gives a great overview of the double cross system in very simple terms, making it very easy to understand.

Miller, A. Ray. *The Cryptographic Mathematics of Enigma*. N.p.: n.p., n.d. Web. <http://www.nsa.gov/about/\_files/cryptologic\_heritage/publications/wwii/engima\_cryptographic\_mathematics.pdf>.

This essay by Ray A. Miller provides a detailed description of why the Germans were so confident in the Enigma, as well as the provide for the first time the precise number of key setting and machine configurations as well as the exact number of setting Allied cryptanalysts were faced with each day. The most significant information provided by this essay however, proves to be an extensive quote by historian David Kahn. Here is a source of the much repeated quote about Enigma shortening the war by at least two years. According to Kahn, “ULTRA was more precise, more trustworthy, more voluminous, more continuous, longer lasting, and available faster, at a higher level, and from more commands than any other form of intelligence - spies or scouts or aerial reconnaissance or prisoner interrogations. It may be concluded that ULTRA saved the world two years of war, billions of dollars, and millions of lives.” This quote is an important source for arguing the importance of Enigma on the war.

Moorhead, Eleony. "The OSS and Operation TORCH." Harvard University, Summer 2009. Web. 03 Jan. 2013. <<http://www.hcs.harvard.edu/tempus/archives_files/x2_02.pdf>>.

 Like the articles by Jan Bury, this paper was immediately authoritative with its extensive footnotes and primary quotes. We ended up using the opening sentence as a quote on the website because it explicitly showed America before the introduction of Bletchley Park. This article focused on Operation TORCH, which seems to have operated simultaneously to the formation of the OSS and didn’t really connect with our topic but it still provided a good picture of American intelligence before WWII. We used it to show the turning point in this regard, which helped our overall thesis.

Mulligan, Timothy. "The German Navy Evaluates Its Cryptographic Security." *Military Affairs* 49.2 (1985): 75-79. *JSTOR*. Society for Military History. Web. 26 Sept. 2012. <<http://www.jstor.org/stable/1988402>>.

 Timothy Mulligan ‘s article focused on the aftermath of the enigma machines; how the evidence was cleaned up, how the Germans looked back on the war and the impact of Triton. It did not really help the part of our thesis about WWII but was instead useful for our focus of cryptology and wars in general. In the article, David Kahn was mentioned (who we already know is an extremely good source) which let us assume that Mulligan did very thorough research. There were intense footnotes and as the short little bio at the end pointed out, Mulligan is an expert in captured German and related records. Mulligan seems like he might be a good candidate for an interview. This article was in a military journal that is obviously intended for high level readers. It was a good find and gave us hints of where to search next.

Murphy, Dr. Charles. Email Interview. 7 Jan 2013.

We stumbled across Dr. Murphy when we were trying to find a source for a quote in a senior thesis from Liberty University. The college student cited her professor, Dr. Murphy so we tracked down his email and started corresponding. When we quickly checked his background, we realized that he was a former CIA analyst and therefore a very authoritative and interesting person to interview. He obliged willingly and even went above and beyond by sending us pamphlets in the mail and inviting us to a CIA luncheon in February. He greatly aided in our long term intelligence argument and provided some helpful quotes. Although his help was rather narrow and focused, we were able to take advantage of it fully and this was a very solid interview.

Murrey, Williamson. "World War II: Ultra -- The Misunderstood Allied Secret Weapon." *World War II: Ultra” The Misunderstood Allied Secret Weapon*. N.p., n.d. Web. 30 Sept. 2012. <http://www.historynet.com/world-war-ii-ultra-the-misunderstood-allied-secret-weapon.htm>.

This article provides insightful information about some drawbacks to processing Ultra information. For instance, while Ultra warned of Germany attack through the Ardennes in 1944, but commanders dismissed this possibility as they thought Germany no longer had the resources for an attack. In addition, this article provides helpful details concerning Enigma use during the Battle of the Atlantic. When the Allies captured the Uboat U-110 in May 1941, it provided them with the settings for the next two months, and the experience of breaking codes for those two months allowed Ultra to continue for another five. The reason this was significant in the war is that German U-boats were controlled from shore, so a massive amount of signaling went back and forth. This provided information on the number of U-boats, tactical dispositions, and patrol lines. There were no other changes in Allied tactics at this time that could possibly have led to the decrease in sinkings. This article also provides excellent information on effects of Enigma throughout the war.

"The North African Campaign Of World War II." *The North African Campaign Of World War II*. N.p., n.d. Web. 18 Oct. 2012. <http://www.topedge.com/panels/ww2/na/intelligence.html>.

 We had briefly read about how decoding the enigma helped the Allies win the North African Campaign but there was still a pretty big hole in our research. With this source, that confusion was quickly resolved. We knew from history last year that the key to winning this battle was having enough supplies and this source clarified that with the enigma, the Allies were able to destroy Axis supply trains and therefore severely weaken their forces. This source also pointed out how the enigma allowed the Allies to stop air traffic and further weaken the enemy. We realized that the enigma was not a single decisive factor, but rather just an aid to the victory in North Africa. Another supplemental point of which to widen our thesis on how big of a turning point the Ultra mission was. This article cited F.H Hinsley and his book (along with a few others), so we knew it was reputable and used plenty of good sources.

Olsen, Admiral Eric T. "OSS REBORN : Office of Strategic Services." *OSS REBORN : Office of Strategic Services*. State Department, 01 Oct. 2010. Web. 07 Jan. 2013.

 This article was key to helping us understand how the OSS impacted the formation of the CIA and therefore our entire intelligence portion of our thesis. This speech was presented at a conference and although much of it is dedicated to thanking those who helped him get to this point and honoring General Donovan, Admiral Olsen gave some interesting historical background and explanation for the CIA.Olsen also provided information on General Donovan, who was the father of the OSS and CIA. This strengthened our conviction that Donovan was an important player and after reading this article, we knew we should do more research on him.

"On This Day: British WWII Code Breaker Alan Turing Goes on Trial for Homosexuality." *On*

*This Day: British WWII Code Breaker Alan Turing Goes on Trial for Homosexuality*.

FindingDulcinea, 31 Mar. 2011. Web. 10 Sept. 2012.

<<http://www.findingdulcinea.com/news/on-this-day/March-April-08/On-this-Day--Britis>

h-WWII-Code-Breaker-Goes-on-Trial-for-Homosexuality.html>.

The “On This Day” series is a favorite article in most newspapers so we thought that reading it would put everything in an interesting light. The article exceeded our expectations and introduced us to some new topics. We had not really noticed how the Polish had tried to break the code before the British and how they had sent over their work to continue aiding the British but this article drew our attention to it. It provided another avenue to research which will make our final project much more complete. We also learned about the intermediate part of Turing’s life, between decoding the enigma and committing suicide about a decade later. Specifically, the article talked about a paper Turing wrote in 1950 which we immediately set out to find. Most articles talk about Turing’s amazing decoding then skip directly to his death. This made the article especially important and valuable.

Ratcliff, R. A. *Delusions of Intelligence: Enigma, Ultra and the End of Secure Ciphers*. Cambridge: Cambridge UP, 2006.

 After determining that reading this entire book would be unachievable, we scanned the chapter titles to see what would be important. It all looked like information we had seen before, except the last two chapters. Titled, “The Role of Science and Machines in the Cryptologic War” and “Recognizing the End of Security,” we decided that these two chapters would provide great insight to the theme of Turning Points in History. Sure enough, they provided detailed explanations of the short and long term effects of the Ultra mission. It discussed the creation of a completely new field of computer science and overall, why the Germans lost the war. Most of the information was things we had seen before, just in more detail. It was a helpful book and certainly well written. There were extensive footnotes and over 70 pages of corresponding notes. It was published by the University of Cambridge, which is dedicated to helping education, not making money so we know that their intentions were good.

Reuvers, Paul, and Marc Simons. "Enigma Cipher Machine." *Crypto Museum*. N.p., 2009. Web. 28 Sept. 2012. <http://www.cryptomuseum.com/crypto/enigma/>.

 When we first started researching, we realized that there were many different types of Enigma machines. We have narrowed our topic down to the German enigma machine (rather than a Japanese one) but there are still many different varieties under the German subcategory. This website, although published for people just interested in the topic rather than professional historians, gives detailed images and descriptions of each individual type and model of the machines. There was a section about “recent news” with information about recently declassified and discovered machines and codes. Even though the Enigma was introduced 70 years ago, it is still important which was really interesting.

Rijmenants, Dirk. "Enigma Machine." *Enigma Machine*. N.p., n.d. Web. 23 Sept. 2012. <http://users.telenet.be/d.rijmenants/en/enigma.htm>.

This article is significant in that it provides numerous details of the direct effects the decryption of the Enigma codes had on World War Two. It details how the capture of an Kurzsignal codebook provided the cribs necessary to turn the tide in the U-boat war. This led to an estimated 700 U-boats and 30,000 crewmen being lost at sea. Enigma code breaking also exposed weaknesses of Rommel’s Afrika Korps, specifically their weak supply lines, providing the Allies’ Marshal Montgomery a huge tactical advantage. In addition, Bletchley Park also gained a great deal of information regarding German troop movements before D Day and was able to confirm the success of the mission to fool the Germans into believing the attack would take place at Pas de Calais.

Rollema, D. W., PA0SE. "Enigma." *Wireless World* (1983): 49-53. Web. 14 Oct. 2012. <http://www.nonstopsystems.com/radio/article-hell-wireless-world-83.pdf>.

 While searching for information about the international conference in 1978, we stumbled across this interesting article. It went over the normal information, although it was quite helpful in educating us about Arthur Scherbius and his contribution to the Ultra mission. While reading the Acknowledgements, we became very excited because Rollema referenced how he found information about the 1978 conference. Unfortunately, it looks like the book is in a foreign language but we will try to find it nonetheless. Furthermore, we looked at Rollema’s sources and noticed, not only a David Kahn source, but also Winterbotham’s book. We have ordered the original “The Ultra secret” from the library and are planning to read that shortly. This showed us that this article did proper research and since its only a few years shy of being primary, it is a very reliable secondary source.

Romano, Kevin, CPT. "The Stager Ciphers and the U.S. Military's First Cryptographic System." U.S. Army, n.d. Web. 11 Jan. 2013.

 One of the key aspects of our argument is the impossibility of cracking the Enigma code, which led to such useful psychological warfare and a sudden increase in interest in cryptology and intelligence. This article spelled out the exact mathematics of the enigma machine and compared it to past ciphers. This not only provided context but explained how the enigma worked. We knew this was authoritative because it was published by an Army Captain and sponsored by the United States Army. Like the things published by the CIA, we know that this is authoritative and had the facts checked. Overall, this was a helpful source and really advanced our argument.

Sale, Tony. "Lecture on Naval Enigma - Tony Sale." *Lecture on Naval Enigma - Tony Sale*. N.p.,

n.d. Web. 13 Sept. 2012.

<http://www.codesandciphers.org.uk/virtualbp/navenigma/navenig1.htm>.

This is a lecture written by an electronic engineer  and computer programer, Tony Sale who was growing up during the time that the Enigma code was being broken at Bletchley. He constructed a replica of the colossus. In his lecture he sums up how the Enigma Machine worked saying that it had a “reciprocal” system this means that when one would plug in a B then a F would appear and if they plugged in an F, then a B would appear. However, this was only possible when the rotors were set to the same setting. That is what made breaking the code so difficult. The poles had cracked the system in the 1930s and were able to decipher the messages, but in 1937, the Germans changed their systems. The Poles were confused at first, when they had no idea why their methods suddenly stopped working. An error by the Germans, however, lead them to finding out the problem. The error was that one ship had not received it’s instruction and sent a message back in the old Enigma system which the Poles were able to figure out and understand that they now had a more complicated system to break.

"Scherbius' Enigma." *Scherbius' Enigma*. N.p., n.d. Web. 30 Sept. 2012. <http://cs-exhibitions.uni-klu.ac.at/index.php?id=282

This article is a broad context source that talks about Arthur Scherbius, who was the inventor of the German military cypher machine. The model used during WWII was the third of the machines, designed to be small and convenient. Scherbius named his machine “Enigma” which means “riddle” in Greek. The reason that the Polish started to investigate the Enigma machine was because of the threat they felt of being attacked by the Germans.  Marian Rejewski, Henryk Zygalski and Jerzy Rozicki were the Polish cryptanalysts who cracked the Enigma code in 1939. Later they Enigma code grew more and more complicated and the the continuation of the cracking of the code was held at Bletchley Park and conducted by the British.

"Secret Machines- A History of British Code-Breaking during World War II." *Archives Secret Machines*. The Institute of Engineering and Technology, n.d. Web. 23 Sept. 2012. <http://www.theiet.org/resources/library/archives/featured/secret-machines.cfm>.

This article gives a broad background to the history of British code breaking up through the Enigma machines. It explains how with the rise of radio communications in the 19th century following the invention of Morse Code ciphers became increasing popular to ensure secrecy. World War I acted as a catalyst for the increased invention of cipher machines, but no successful machines to prevent eavesdropping were developed until after the war. This continued through World War Two, and prompted the beginnings of British computer technology.

Sheffield, Gary. "The Battle of the Atlantic: U-boat Peril." *BBC News*. BBC, 30 Mar. 2011. Web. 23 Sept. 2012. <http://www.bbc.co.uk/history/worldwars/wwtwo/battle\_atlantic\_01.shtml>

In order to further understand the importance of the breaking of the Enigma code, we researched the Battle of the Atlantic and the impact of Enigma related intelligence. This article was written by Gary Sheffield, a historian that has written many books on both world wars, and published by BBC, making it a very reliable source. The article gives an overview of the Battle of the Atlantic and the importance of it on the war. Without the Allies success in the Battle of the Atlantic, American and British forces would not have been able to land at Normandy, France on D-Day. The article also state two main factors other than ships that allowed for Allied success in the Battle of the Atlantic, the airplane and intelligence gained from breaking the Enigma code. It was also during this battle that the Royal Navy were able to seize an Enigma machine from a German boat.

Singh, Simon. *The Code Book.* New York: Doubleday, 1999.

Singh’s *The Code Book* provides a stunning insight into the mathematical and scientific processes of cryptology. No other book that we have across in our search provided such a valuable insight into the process of public key encryption. This book traced the history leading up to the discovery of public key encryption as well as the actual principles applied in the creation of the cipher. Singh manages to present the information in a thorough and understandable way. No stone is left unturned, but at no point do Singh’s explanations go beyond comprehension. This book was pivotal to the development of our public key encryption page.

Smith, Michael. E-mail Interview. 5 January 2013.

Michael Smith has authored many books about Bletchley Park and the work of British Intelligence Agencies such as MI5 and MI6. In this interview, we asked questions about the modern day work of these organizations, how cracking the Enigma code changed the responsibilities of these organizations, how British-American relations changed after WWII, and how cryptologic technology changed after the Enigma code was cracked. Mr. Smith provided very helpful information about modern organizations that could not be found elsewhere.

Spaulding, G. H. "Enigmatic Man." *Enigmatic Man*. N.p., 4 Sept. 2012. Web. 12 Oct. 2012. <http://www.ghspaulding.com/enigmatic\_man.htm>.

 This article explained his connections within the German armed forces, including his direct contact with Hitler. This article had sections about each of the important parts of the war, such as the Battle of the Atlantic, the North Africa battlefront, and the storming of Normandy on D-Day. By finding this source, we were able to understand a bit more about the man who was not only an influential captain but also a primary force in the declassification of the mission.

Spiller, Roger J. "Some Implications of Ultra." *Military Affairs* 40.2 (1976): 49-54. *JSTOR*. Web. 28 Sept. 2012. <http://www.jstor.org/stable/1987144>.

Roger J. Spiller, a well known military historian, published this scholarly journal article in 1976, in reaction to the book, *The Ultra Secret*, by Winterbotham, the first book published about Ultra, revealing this information to the public for the first time. This article examines the impact of Ultra on World War Two and gives specific examples about battles during the War. It states that the Allies were able to use Ultra in the Battle of Britain, as one scholar believes that without Ultra, the Battle of Britain would have been lost. Ultra also allowed the Allies to know when the Axis powers had decided to stop bombing Britain, from intercepting a German coded message. Overall, Spiller decides that information gained from Ultra removed the uncertainty of what the Axis powers were doing and made their intentions clearer.

Stafford, David A. T. ""Ultra" and the British Official Histories: A Documentary Note."*Military Affairs* 42.1 (1978): 29-31. *JSTOR*. Web. 6 Oct. 2012. <http://www.jstor.org/stable/1986634>.

 We had been slightly confused as to why the Allies kept the Ultra mission so secret after the war but this article cleared that confusion up. Written by David Stafford, a professor at the University of Victoria, this article offered a professional view on the newly declassified information and why it took so long. Most of the article was dedicated to talking about laws and statements from after the war, which doesn’t explicitly help our topic but certainly helps us understand why it was such a turning point. The length that they went to conceal the evidence shows how important and monumental the Ultra mission was. Found on JSTOR, we knew that this article would be reliable and authoritative.

"The Enigma Secret." *BBC*. 14 Oct. 2011. Web. 22 Sept. 2012. <http://www.youtube.com/watch?v=IJToxIZMbZQ>.

This documentary was extremely helpful because for one of the first times, we could see what people looked like and exactly how the machine worked. Towards the beginning of the program, there was an animated illustration of the enigma machine that also used a parallel modern day machine to fully demonstrate how the enigma worked. This was extremely helpful and really helped us visualize the entire project. Images and descriptions of pre-WWII helped provide context and information about how the machine was used in the war. One of the most helpful parts was the rather lengthy section about Poland. The documentary described the Polish attempting to break the code and then how after they fell, the French took over. For a documentary, it was surprisingly in depth and detailed. Since it was created by BBC, we were fairly confident that it was reputable. We kept in mind that it was intended to be entertainment, which wasn't ideal, but after watching, we concluded that it was still very useful. It helped solidify our ideas on how the enigma machine was a turning point in the war but it failed to give more information on how it was a turning point in other areas, such as cryptology.

Tony. "Interview on GCHQ." E-mail interview. 14 Nov. 2012.

Tony, whose last name was unavailable due to security reasons, helped clarify for us many issues regarding Britain's Government Code Headquarters. Tony was vital in explaining how the decryption of Enigma led to a mechanization of process at Bletchley Park, in addition to large assumption of duties by GCHQ in general. Tony also helped us reject certain arguments, such as Enigma setting an example as breaking an impossible code, and the conference on Ultra in 1978.

"The Office of Strategic Services: Secret Intelligence Branch." *Central Intelligence Agency*. N.p., n.d. Web. 20 Oct. 2012. <https://www.cia.gov/news-information/featured-story-archive/oss-secret-intelligence-branch.html>.

This CIA description of the OSS explains the organization of the Secret Intelligence Branch, and also gives a brief overview of the organization of the entire OSS. The article states that the OSS was modeled after the British Intelligence organizations and therefore has the following three branches: Secret Intelligence (SI) Branch, Special Operations (SO) Branch and Morale Operations (MO) Branch. Again, the SI branch was modeled after British intelligence, and Donovan sent new agents to Britain to learn their methods of espionage techniques, covert communications, and secret codes.

Travares, Ernest S. "OPERATION FORTITUDE: THE CLOSED LOOP D-DAY DECEPTION PLAN."  Maxwell Air Force Base, Apr. 2001. Web. 25 Mar. 2013. <http://www2.warwick.ac.uk/fac/soc/pais/people/aldrich/vigilant/tavares\_fortitude.pdf>.

 Published by a former Major in the United States Air Force, this report explains the second half of World War II from the perspective of an upper level officer. As a Major, he may have had limited access to enigma decrypts on the field and therefore would have had an interesting perspective. His military knowledge must've came in handy during his research, and it is still clear that he did quite a bit of it. We know that this Major was authoritative and reputable because as such a high rank, he should have security clearance and have deserved his position. This interesting pdf. is not explicitly primary but because of the unique author, this article gave an interesting perspective.

Tzu, Sun. "Chapter 2." *The History of Intelligen ce in the United States*. N.p.: n.p., n.d. N. pag. Web. <<http://www.olemiss.edu/ciss/collateral/pdf/UK_Summer_2010/Jensen-History%20of%20the%20IC.pdf>>.

In this chapter of the book, Sun talks about how the United States had not always had a very strong intelligence. This is because of the many inalienable rights and moral values that comes with being an American.  It seems morally wrong to spy on other people’s private business. However, over the years, with each war, the United States started to understand the importance of having a strong intelligence. She also mentions the one of the Ally’s greatest successes as cracking the Enigma code and saying that it was crucial to perform the operations such as D-Day.

Walton, Calder. "Review of Books." Rev. of *Delusions of Intelligence: Enigma, Ultra, and the End of Secure Ciphers by R. A. Ratcliff*. *The International History Review*29.4 (2007): 903-04. *JSTOR*. Web. 6 Oct. 2012. <<http://www.jstor.org/stable/40110964>>.

 Since we had not experienced many reviews before, we were not sure what to expect but Walton’s review of Ratcliff’s book was very interesting. It provided further insights on topics like the amount of knowledge enemies commonly know about each other and how the introduction of Enigma made the amount of knowledge multiply like crazy. Walton even points out a few places where he thinks that Ratcliff made some mistakes, which helps us see different sides of the same story and therefore make conclusions for ourselves. He ends his review with the thought that hopefully intelligence agencies today are “asking themselves precisely the kinds of questions that Germany’s intelligence services did not ask during the Second World War.” This final statement helped us see the long term effects of the Enigma and Ultra mission by defining how the enigma changed history and therefore was a turning point.

Wark, Wesley K. "British Intelligence on the German Air Force and Aircraft Industry, 1933–1939." *The Historical Journal* 25.03 (1982): 627-48. *JSTOR*. Cambridge University Press. Web. 26 Sept. 2012. <http://www.jstor.org/stable/2638748>.

 The word “Enigma” may have not been mentioned in this article but that doesn’t mean it wasn’t valuable. It helped us to understand why the Germans didn’t have as sophisticated cryptology as the British did (the reason being that they valued operations and decided it was better to have more equipment and trained men rather than intelligence) and how the German Armed Forces were set up. There was quite a bit of military jargon but with the help of a dictionary, we were able to understand most of it. We were happy to learn why the Allies used cryptology more and therefore why the Enigma was allotted more valuable resources (in general, the Allies produced less ships and equipment which made them have a disadvantage). Wark’s article was definitely meant for more advanced and educated readers than we are but it was very informative and reliable.

Wark, Wesley K. "Reviews." Rev. of *The Enigma Spy: An Autobiography by John Cairncross*. *International Journal* Spring 1998: 372-74. *JSTOR*. Web. 6 Oct. 2012. <http://www.jstor.org/stable/40203315>.

 We had read about John Cairncross, the enigma spy but were unable to find more information about him. We searched for hours trying to find an English copy of his autobiography but with no luck. This review kept popping up so we decided to read the review and continue looking for the autobiography after. We knew that Wark was a good author from the other scholarly journal article we read and his review did not disappoint. It was a little summary-heavy, rather than analytical but helped us understand who John Cairncross was and what he did. Since it was an autobiography, Wark focused more on what Cairncross did rather than how accurate his facts were. In particular, Wark mentioned the last chapter titled, “Je ne regrette rien” and thanks to our years of studying French, we were able to translate that to “I do not regret anything” or “I regret nothing.” This was a pretty good review and inspired us further to try to find an English version of Cairncross’ autobiography.

Wenger, J. N.; Wilcox, Jennifer E. "Solving the Enigma: History of the Cryptanalytic Bombe." NSA. Lent by Dave Lion. Web. 21 Oct. 2012. <http://ed-thelen.org/comp-hist/NSA-Enigma.html>.

 We stumbled upon this source when looking for how the United States’ code breaking was affected in response to the British efforts and although it didn’t answer that question, this website provided extensive information about the Ultra mission as a whole. In particular, it included a great chart comparing two different types of bombes. There was a large section on German mistakes (which we had read about before but not in such great detail) and explicit detail on “Waves,” the naval personnel that worked on the machine. They even talked about how most of the workers did not even know what they were working on; just that they had to break this secret code. This website was very interesting and one of the best parts about it is that there were many quotes from people that had actually working on the mission and at Bletchley Park. We knew that the authors must have done very extensive research and conducted many primary interviews.

Wesolkowski, Slawo. "The Invention of Enigma and How the Polish Broke It Before the Start

of WWII." (n.d.): n. pag. *IEEE Global History Network*. University of Waterloo. Web. 30 Sept. 2012.

This essay from Slawo Wesolkowski at the University of Waterloo in Canada provides a general look at many aspects of Enigma as well as of Ultra. Wesolkowski’s essay is helpful in gaining a foundation on a wide variety of aspects. He discusses the origins of Enigma machines, the uses of Enigma, the uses of Enigma decryption, and a variety of insights into Britain’s Ultra operations. The source is well researched and contains reference to a wide range of historians and authors which gives credibility to an otherwise unknown writer. With this wide array of works contributing to this essay, it also helps to give a wide base of opinions on Enigma and Ultra. Overall the work is a good context source that covers many bases in one go.

"What Was OSS." *CIA.gov*. Central Intelligence Agency, 28 June 2008. Web. 21 Oct. 2012. <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/oss/art03.htm>.

After a slew of sources discussing the general history of the CIA it was great to finally find something discussing a specific aspect of its history. In this brief article from the Central Intelligence Agency, the groundwork for the CIA, the OSS, is discussed. The OSS was the Office of Strategic Services and was the predecessor the CIA. The OSS was in every way a foundation for the CIA because it conducted almost all of the activities that the CIA conducts today. Interestingly, when the OSS was first formed there was a great deal of animosity towards it throughout the other United States departments and agencies. Other branches of the government felt that by establishing the OSS they were going to lose a significant amount of resources. It was enlightening to see that bureaucracy has existed for quite some time and even sought to stifle some of the more successful agencies of the United States. Overall the source was good for understanding the predecessor to the CIA and how intelligence was handled in the US prior to the CIA.

White, Adam. "How a Secret Spy Pact Helped Win the Cold War." Time U.S., 29 June 2010. Web. 27 Mar. 2013.

 As soon as we realized that we wanted to research international cooperation, we began searching for reputable sources about the BRUSA and UKUSA agreements. This came in very handy, with explicit detail about the process of forming these secret agreements. The article cited the official historian of MI5, which helped us know that this was a good source. We know that Time magazine is a reputable source, similar to BBC or NY Times. Furthermore, Adam White cited many books and authors whose names we had seen around and cited. This helpful source explained parts of the increasingly important relationship between Britain and the U.S.

Zebecki, David T. "World War II: North Africa Campaign." *World War II: North Africa Campaign*. History.net, n.d. Web. 08 Oct. 2012. <http://www.historynet.com/world-war-ii-north-africa-campaign.htm>.

This article provides a broad historical overview of the African Campaign during World War Two, and the context of role Ultra played in that campaign. The article explains how the North African Campaign began was a struggle for control of the Suez Canal and thus access to oil and raw materials from the Middle East. It began in 1935 when Italy invaded Ethiopia and Britain stationed an army in Egypt in response. In 1940 Italy declared war on Britain, and in 1941 after many Italian defeats Germany committed to the African fighting. Throughout the following battles, Ultra provided the Allies with various information on the German forces supply lines and Rommel's plans.