

Agathe Benichou
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From war time communication and decryption to modern day social media society

In *Computing: A Concise History*, Ceruzzi explores the development and impact of computers from the 1800s to modern day. The beginning of the book focuses heavily on how the unprecedented military demands of World War II, as well as large wartime budgets, stimulated innovation and the need for faster machines. The United States, Great Britain and other countries poured national resources into developing new and superior weapons. However, anti-aircraft guns and dive bomb planes were not the only areas that needed to improve if the Allies wanted to win the war; they needed efficient communication and decryption systems in order to outsmart the enemy. The advancement of computers for enhanced wartime communication and decryption played a vital role during World War II but more importantly, its long standing effects contributed to the course of technological innovation and lead to advancements in the field of Computer Science.

Much of the technology created during World War II had its roots in the 1930s. Prior to World War II, the radio was most widely used for military signal communication. According to Encyclopedia Britannica:

“The navies of the world entered World War II with highly developed radio communication systems, both telegraph and telephone, and with development under way of many electronic navigational aids. The use of telephone systems on naval vessels had come into common use. Air forces employed wire and radio communication to link up their bases and landing fields and had developed airborne

long-range, medium-range, and short-range radio equipment for air-to-ground and air-to-air communication.”

However, these systems were found to lack the necessary speed and independence needed to be competitive during World War II. For example, while its development was rapid and its use was extensive, wireless telegraphy was deficient in secrecy since enemy forces could hear the messages just as much as friendly forces. As a result, armies created intricate and perplexing codes to encrypt their messages in order to transmit them in unmitigated secrecy and security. The demand for long range and high speed communication increased during the war but could only be achieved by modifying the vacuum tube which has been developed for radio and telephone applications. Since the war made large sums of national money available for research by scientists and engineers, these communication devices were improved.

These continual advancements in technology were necessary to maintain a competitive edge over the enemy. The Germans had a machine called the Enigma which produced highly encrypted text. Similar to a portable typewriter, the operator would type a message and turn wheels which would encrypt the message through the machine. The receiving operator would set the machine with the same wheel to decrypt the message. The Allies were able to decrypt these codes and develop code breaking techniques. As a result, England established Bletchley Park and brought together mathematicians and engineers to create devices that would decrypt messages. Here, devices such as the Colossus and the Bombe were secretly developed and operated during World War II in order to decrypt German messages. The Bombe, which was designed by Alan Turing, used mechanical wheels and electric circuits to decode messages encrypted by the

Enigma machine. The Bombe used vacuum tubes for the processing and storage of data while running at rapid speeds. These machines were destroyed after the war in order to maintain secrecy and seeing that there was no commercial use for them. However, the skills and tactics developed during the war did not go to waste. After the war, “American code breakers working for the navy used their experience to develop a general purpose electronic computer called the ERA 1101,” (Ceruzzi, 38). This proved that it was possible to transfer wartime technology to everyday use and encoded communication machines greatly influenced a number of areas such as computer science and electronic communication.

Ultimately, the knowledge gained from the wartime communication and decryption machines outlived its wartime uses. After World War II, engineers and scientists were able to build off of wartime developments to create mainframe computers, transistors and microprocessors. Companies such as IBM, Intel, Apple and Microsoft were able to transform computers from a giant room size machine that required several operators and a great deal of attendance to personal mini computers that were able to be controlled by everyday hobbyists and business people. The Internet was able to link people across countries in a private way that the radio or telegraphs never could. Networks were being built locally and globally so that people could communicate from the comfort of their homes. Internet protocols were inspired by the encryption methods used during the war but were developed for user protection of information on the World Wide Web. Mobile smart phones allowed access to the web on the go and its evolution illustrates the significance of technologies developed during the war. The rise of Facebook, Twitter and other social media outlets all started from the need for faster

communication and were secured with the same decryption methods used during the war.

Ceruzzi even states: “The combination of computing and communication unleashed a flood of social change, in the midst of which we currently live,” (Ceruzzi, 2).

The federal government, which drove the funding for technology during World War II, remains a large user and contributors to technology and the Web. The advancements of various technologies during the war truly influenced the outcome of World War II and the growth of communication and decryption machines was vital in molding today’s extensive network of personal computers, tablets and smartphones. To this day, “No war had as profound an effect on the technologies of our current lives than World War II (1939-45). And no war was as profoundly affected by science, math, and technology than World War II.” (Mindell)

Citations

Ceruzzi, Paul E. *Computing: A Concise History (The MIT Press Essential Knowledge Series)*. N.p.: MIT, 2012. Print.

Copeland, Jack. "The Rutherford Journal. "Colossus: Breaking the German 'Tunny' Code. N.p., n.d. Web. 11 Feb. 2017.

"Colossus: Birth of the Digital Computer." *Colossus*. Crypto Museum, n.d. Web. 11 Feb. 2017.

"Encoded Communications of World War II." *Encoded Communications of World War II | ShoreTel*. N.p., n.d. Web. 11 Feb. 2017.

Mindell, David, Dr. "The Science and Technology of World War II." *The Science and Technology of World War II - North Carolina Digital History*. The National Museum of World War II, n.d. Web. 17 Feb. 2017.

"Military Communication." *Encyclopædia Britannica*. Encyclopædia Britannica, Inc., n.d. Web. 11 Feb. 2017.