

1145-VD-2265 **Neil Sigmon*** (npsigmon@radford.edu), Department of Mathematics and Statistics, Radford University, Radford, VA 24142, and **Rick Klima** (klimare@appstate.edu), Department of Mathematical Sciences, Appalachian State University, Boone, NC 28608. *The Logic Behind the Turing Bombe's Role in Breaking Enigma.*

The work of the codebreakers at Bletchley Park in breaking the German Enigma cipher during World War II was one of the most extraordinary events in human history. Led by Alan Turing, the codebreakers employed an electromechanical device known as the bombe to regularly cryptanalyze and read German encrypted communications throughout much of the war. This work likely helped the Allies to win the war much sooner than expected and saved countless lives. Due to the extraordinary number of combinations that the Enigma could be set to, the Germans believed that the Enigma was impenetrable. However, Turing and the codebreakers were able to use the bombe to exploit the part of the Enigma that the Germans thought gave the device its most security. This paper will describe the logic behind how the bombe exploited the Enigma cipher. To demonstrate the process involved, technology involving Maple will be used to describe the cryptanalysis. (Received September 25, 2018)