



0. TURING'S BOMBE CALLED VICTORY - Story Preface

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11. WAS THERE a SPY in HUT 8?

12. STATION X CODE BREAKERS SHORTEN the WAR

Because Churchill ordered all the code-breaking hardware to be destroyed at Bletchley Park, after Germany surrendered, original devices did not survive. This image depicts a rebuilt Turing bombe. The first-such Turing-Welschman bombe was called "Victory." It was installed, for a time, in Hut 1. Ted Coles took this picture of the working, rebuilt bombe at Bletchley Park (which is called "Phoenix"). He has [released his photo into the public domain](#).

Dr. Shaun Wylie, who knew [Turing](#), remembers that "machines and ideas" were Turing's real love. He was able to fuse both of his interests when he created his first decoding machine - dubbed "Victory" (not "Christopher") - with Gordon Welchman (head of Hut 6).

Turing used his pre-war research, "On Computable Numbers," to create primitive computing machines known as "bombes" (nicknamed "Bronze Goddesses") which acted like search engines. Without his insights, critical breakthroughs into systematic code-breaking would likely have never happened.

Dr. Jack Good, who worked with Turing in Hut 8 (and is portrayed by James Northcote in "The Imitation Game"), believed that Turing's bombe was invaluable:

Turing's most important contribution, I think, was of part of the design of the bombe, the cryptanalytic machine. He had the idea that you could use, in effect, a theorem in logic which sounds to the untrained ear rather absurd; namely that from a contradiction, you can deduce everything.

The bronze goddesses were electromechanical machines in bronze cabinets. They checked messages, at high speed, for possible combinations. And ... significantly ... Turing's decoding machine incorporated Enigma's flaw.

What was Enigma's flaw? Any letter of the code could never become itself. Ever.

Dr. James Grime explains why that flaw made such a difference to Turing and his Station X colleagues in this Numberphile video.

Turing knew that fact, so when he created his system to crack Enigma, he built that flaw into his code-breaking strategy.

Every day Turing would draw up a menu of possible combinations (because Enigma changed every single day, at midnight). Operators would set the bombes to test the intercepted and encrypted messages against the possible combinations on Turing's menu.

The bombe machine processed the possible Enigma combinations by applying electrical current to those possible combinations. "Victory," as the very first machine was dubbed, greatly speeded-up the decoder's analysis by running the potential combinations electrically (via electrical circuits), eliminating the need to process intercepts by hand.

The decoding machine, which was initially placed in Hut 1 at Bletchley Park, applied electrical current to the

decoder's assumptions. If those deductions were all wrong, the bombe gave the decoder that information instantaneously via electrical circuits.

Put differently ... the bombe came up with the right answers by a process of elimination. So the product of the bombe's analysis reveals what was not wrong. The decoders would then check that result by hand to see if it worked.

The bombe was so fast that it could go through all the rotor positions, of a 4-rotor machine, in about twenty minutes.

See [Alignments to State and Common Core standards for this story online at:](http://www.awesomestories.com/asset/AcademicAlignment/TURING-S-BOMBE-CALLED-VICTORY-The-Imitation-Game)

<http://www.awesomestories.com/asset/AcademicAlignment/TURING-S-BOMBE-CALLED-VICTORY-The-Imitation-Game>

See [Learning Tasks for this story online at:](http://www.awesomestories.com/asset/AcademicActivities/TURING-S-BOMBE-CALLED-VICTORY-The-Imitation-Game)

<http://www.awesomestories.com/asset/AcademicActivities/TURING-S-BOMBE-CALLED-VICTORY-The-Imitation-Game>

Questions 2 Ponder

Is It True that from a Contradiction, We Can Deduce Everything?

Alan Turing had an idea that from a contradiction, we can deduce everything. How, do you think, that works?

Is It Important to Always be Recognized for Our Contributions?

People at Bletchley Park played a key role in a major WWII event—sinking of the German battleship, Bismarck—but they were not allowed to talk about it. Do you think that people working under similar circumstances today could keep such a secret? Why / why not?

What kind of character traits are necessary for people, like the Bletchley Park workers, to remain quiet about their accomplishments?

How Do Cultural Mores Impact Secret-Keeping?

During World War II, Alan Turing and his Bletchley-Park team worked in secret to crack the Germans' "Enigma" codes. It wasn't until long after the war that people worldwide learned about the efforts of these amazing people.

Does the constant presence of social media make secret-keeping more difficult today than it was during WWII? Explain your answer.

Is the lack of secret-keeping ability a good or a bad thing? Explain your answer.

Have cultural attitudes about secret-keeping changed? If so, how (and why)?

Should Governments Risk Giving Away Secrets to Save Lives?

During WWII, if government officials had information that Germany was planning to sink a certain ship (or ships), would the government have a moral obligation to share that knowledge and prevent the sinkings? Why, or why not?

What if acting on the knowledge would have given-away the fact that Britain's code breakers were understanding Germany's encrypted messages? Under those circumstances, what is the moral path to follow regarding the soon-to-be-attacked ship(s)?

If you were a member of the decision-making team, and you had a close relative on board the ship, would you be able to make the right call to inform (or not inform) the ship's captain? If you couldn't set-aside your personal feelings, should you step-away from making the decision?

When Is It Acceptable to Allow the Deaths of a Few to Save the Lives of Many?

Is it acceptable strategy to allow the deaths of some individuals to save the lives of more individuals (or to win a war)? How do we make such decisions?