



AUG 2020

BENEATH THE SURFACE

#007



EARLY IN WORLD WAR II, ONE OF THE MOST POWERFUL WEAPONS NAZI GERMANY HAD WAS A LARGE FLEET OF SUBMARINES, KNOWN AS U-BOATS (IN GERMAN: *Unterseeboot*.)

U-BOATS PREYED ON CONVOYS IN THE ATLANTIC CARRYING VITAL SUPPLIES FROM THE U.S. TO GREAT BRITAIN. SHIP LOSSES THREATENED BRITAIN'S EXISTENCE.



GERMAN U-BOATS WERE SO SUCCESSFUL THEIR CREWS CALLED THIS PERIOD EARLY IN THE WAR "THE HAPPY TIME."

U-BOATS WERE SO BOLD THEY SANK SHIPS JUST OUTSIDE U.S. HARBORS, IN SIGHT OF THE PEOPLE WHO HAD LOADED THEM.



SOMETHING HAD TO BE DONE.

U-BOATS GOT THEIR ORDERS BY ENCRYPTED RADIO MESSAGES FROM THEIR HEADQUARTERS. THE MESSAGES WERE PROTECTED BY THE ENIGMA, A HIGH-GRADE CIPHER MACHINE THAT TURNED PLAINTEXT INTO GOBBLEDEGOOK FOR TRANSMISSION, AND THEN BACK INTO PLAINTEXT ON THE SUB. THE ENIGMA WAS A VERY COMPLEX MACHINE TO BEGIN WITH, AND GERMAN SUBS USED A SPECIAL VARIANT THEY BELIEVED COULD NOT BE SOLVED.



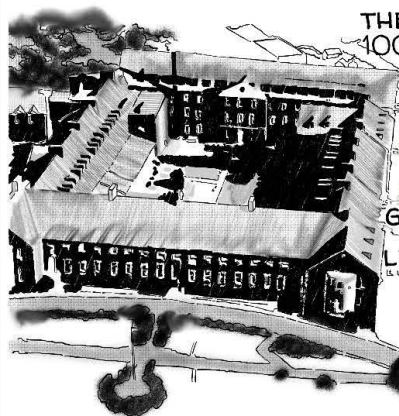
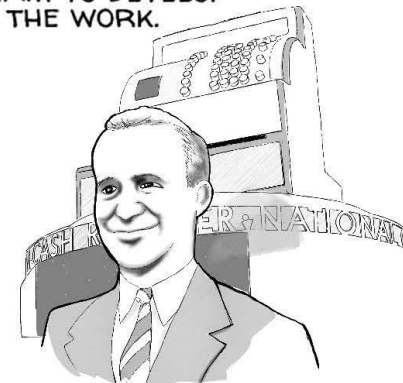
BRITISH CRYPTANALYSTS AT THEIR HEADQUARTERS, BLETCHLEY PARK, NORTH OF LONDON, WITH EFFORT FINALLY SOLVED THE GERMAN NAVY ENIGMA.

THE SOLUTIONS TOOK TIME, BUT THE BRITISH DEVELOPED A MACHINE CALLED A **BOMBE** THAT SPEEDED THE PROCESS UP.

THEY ALSO SHARED THE METHOD OF SOLVING THE ENIGMA WITH CRYPTANALYSTS FROM THE UNITED STATES.



THE U.S. NAVY CONTRACTED WITH THE NATIONAL CASH REGISTER IN DAYTON, OH, TO DESIGN AND BUILD AN IMPROVED VERSION OF THE BOMBE. ENGINEER JOSEPH DESCH ASSEMBLED A TEAM TO DEVELOP BLUEPRINTS FOR THE WORK.



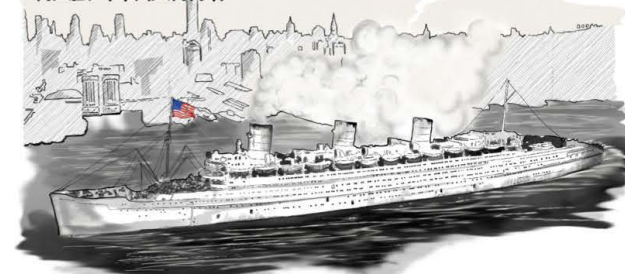
THE U.S. NAVY PUT OVER 400 bombes IN OPERATION IN A SPECIALLY GUARDED BUILDING IN WASHINGTON, D.C. THESE MACHINES ENABLED NAVY CRYPTANALYSTS TO SOLVE MESSAGES GIVING U-BOATS THEIR ORDERS--OFTEN LEARNING IN ADVANCE WHERE U-BOATS WERE TOLD TO RENDEZVOUS TO ATTACK A BRITISH OR AMERICAN CONVOY.



THE U.S. GREATLY IMPROVED ITS ANTI-SUBMARINE WEAPONS, AND, NOW WITH ACCURATE LOCATIONS FOR U-BOATS, NAVY AIRCRAFT AND SHIPS SANK LARGE NUMBERS OF U-BOATS.

THE LOSSES WERE SO MANY THAT THE U-BOAT COMMANDER LIMITED SUBMARINE OPERATIONS TO COASTAL AREAS OF EUROPE, WHERE THEY COULD BE BETTER PROTECTED.

THIS WAS THE TIME WHEN THE U.S. BEGAN SENDING HUNDREDS OF THOUSANDS OF SOLDIERS AND TONS OF SUPPLIES TO EUROPE TO HELP LIBERATE IT FROM NAZI TYRANNY.



VICTORY AGAINST THE ENIGMA AND THEN THE U-BOATS HELPED THE AMERICAN NAVY AND COAST GUARD DO IT MORE SAFELY, AND, THEREFORE, FASTER.