The Electronic Computer is Born

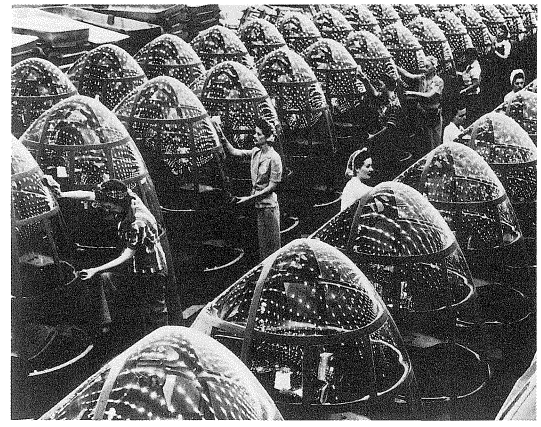
Before World War II, solving complex mathematical problems took a long time and required the coordination of dozens of people working with mechanical calculators. These workers were often called "computers." With the War, the British and U.S. governments funded major efforts to develop automatic calculating machines. By and large, the British focused on tools for cracking coded messages, and the U.S., on tools to achieve accuracy in firing from ships and in the field. The modern electronic computer sprang from these efforts.

One such effort was Project Whirlwind at the Massachusetts Institute of Technology (MIT). Like many other early experimental computers in the U.S., Whirlwind was built with government support—close to $4.5 million over the course of the project. Started during World War II by the U.S. Navy, Whirlwind continued to receive military support after the War and led to many important advances in computer technology.

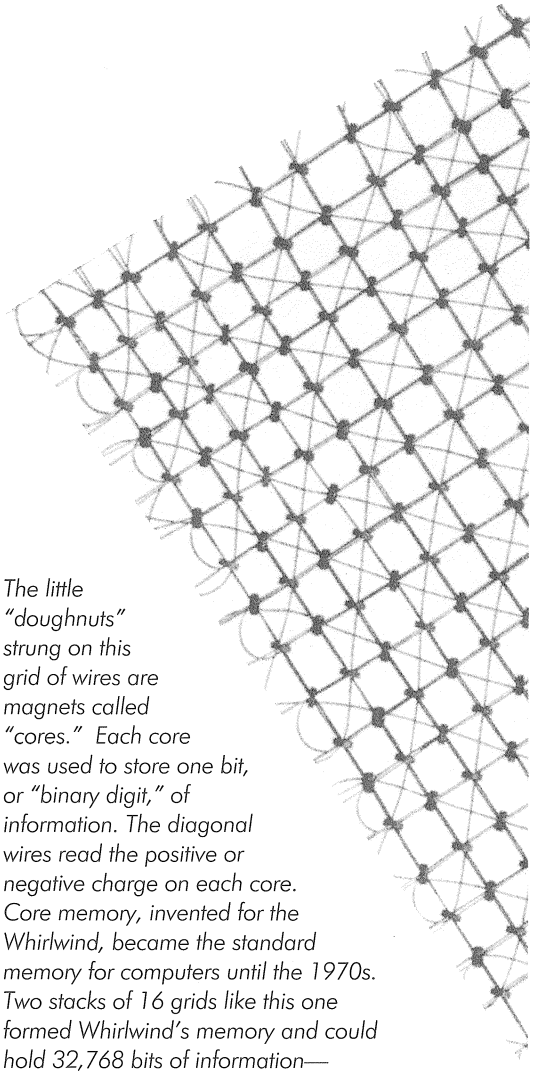
Jay W. Forrester led the team at MIT that developed the Whirlwind computer. The original goal had been to build a machine for training Navy pilots during World War II. Simulating the response of an airplane meant executing complex calculations as rapidly as the pilot moved the controls. At the time, it proved difficult to build a computer which was that fast.

The Whirlwind's circuitry depended on over 12,500 vacuum tubes. Since vacuum tubes burned out, Forrester and his team worked to increase their reliability, designing the computer so that the vacuum tubes could be periodically checked and those in imminent danger of failure could be easily removed and replaced. In search of ever greater speed, the engineers constantly refined their designs. The development of faster, more reliable circuits and memory enabled Whirlwind to meet its original goals for speed, but by then the War was over, and the purpose of the project had changed.

After the War, the Air Force took over support of the project, and Whirlwind became a prototype for an air defense computer system that tracked every plane flying over North America. The Whirlwind also became a resource for academic research. The machine was never idle; when it was not doing work for the Air Force project, MIT professors took the opportunity to assign it calculations that would otherwise have taken hundreds of hours to solve by hand. Using the computer, they tackled such problems as designing optical lenses, controlling machinery, and studying economics, to name just a few.

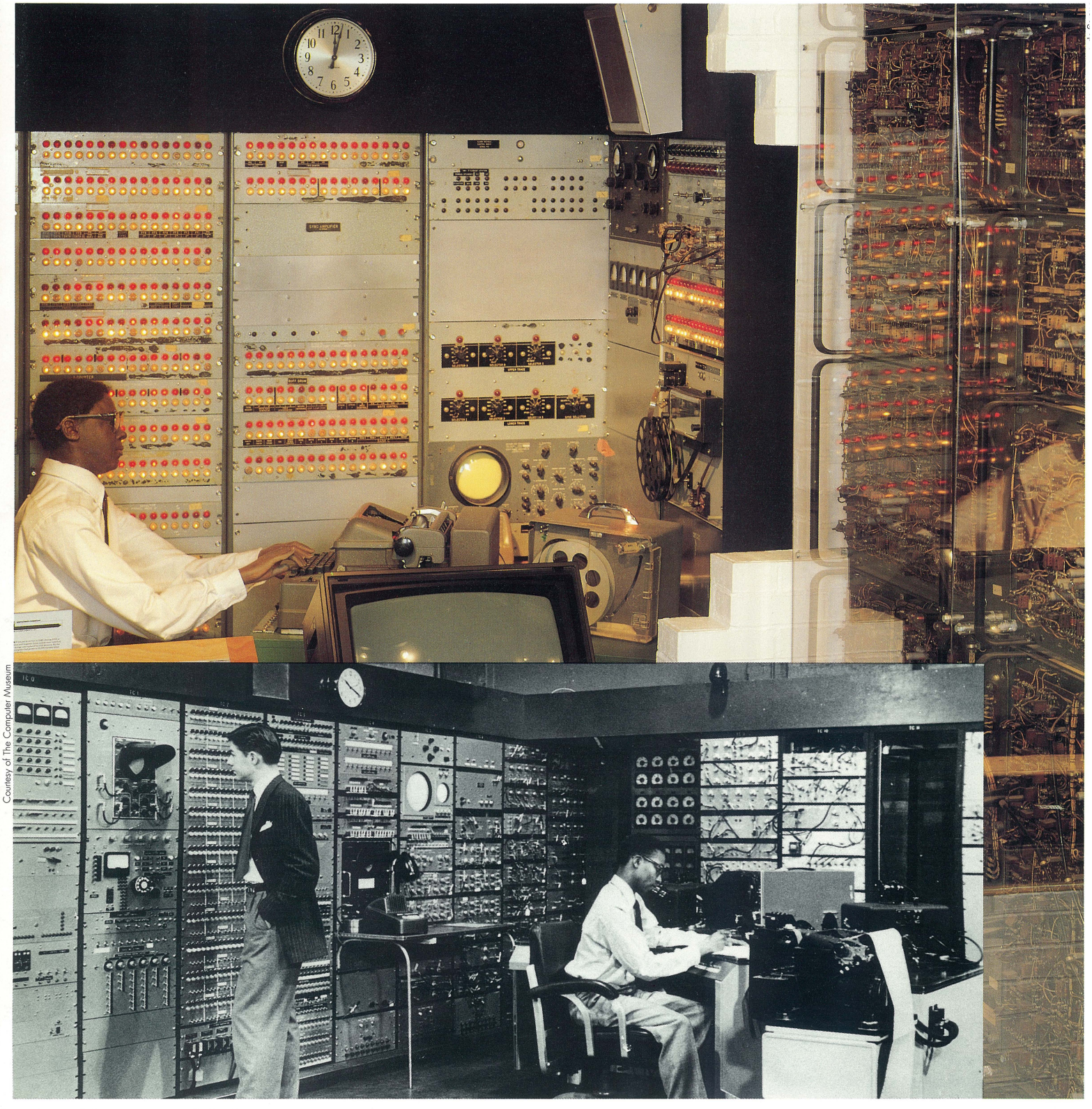


World War II forced nations to build planes, tanks, ships, and guns in greater variety and number than ever before. Around the world, money and minds focused intently on developing new technologies. These efforts produced many important inventions: jet engines, rockets, radar, the atom bomb, and the computer.



The little "doughnuts" strung on this grid of wires are magnets called "cores." Each core was used to store one bit, or "binary digit," of information. The diagonal wires read the positive or negative charge on each core. Core memory, invented for the Whirlwind, became the standard memory for computers until the 1970s. Two stacks of 16 grids like this one formed Whirlwind's memory and could hold 32,768 bits of information—or 4K bytes.

Courtesy of The Computer Museum



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Joe Thompson, one of Whirlwind's full-time operators, was hired right out of high school. He is shown preparing instructions for the computer on a "Flexowriter." The racks of switches and lights along the wall of the control room allowed the operator to check that Whirlwind's circuitry was running correctly. The Whirlwind control room and computer occupied 3,100 square feet, the size of a ten-room house.