

Vannevar Bush, internet pioneer

Vannevar Bush was never directly involved with the creation of the Internet, for he died before the creation of the worldwide web, yet many consider Bush to be the godfather of our wired age, often making reference to his 1945 essay, "As We May Think." In the article Bush describes a theoretical machine he calls a "memex", which was to enhance human memory by allowing the user to store and retrieve documents linked by associations. This associative linking was very similar to what is known today as hypertext. Bush's innovative idea for automating human memory was obviously important in the development of the digital age, but even more important was his influence on the institution of science in America. His work to create a relationship between the government and the scientific establishment during WWII changed the way scientific research is carried on in the U.S. and fostered the environment in which the Internet was later created.

Bush was born on March 11, 1890, in Chelsea, Massachusetts. His father was a Universalist minister. As a child, Bush was sickly and was occasionally bedridden for long stretches of time. But Bush did well in school where he showed an aptitude for math. His academic success fueled his desire to do things his way while not depending on others' rules. This trait would become increasingly evident later in his life.

His first experience as an inventor was a land surveying device he called the profile tracer. It looked something like a lawnmower. As it was pushed over land, it automatically calculated elevations and drew a crude map. It allowed one person to do the work usually done by three. By 1917 Bush had an idea for a device that would use magnetic fields to detect submarines. His device proved to be successful in testing, but Navy officials, who generally viewed Bush as somewhat of a maverick, did not deploy the device correctly and it proved virtually useless in combat. Bush again learned that a successful engineer also has to be a good politician.

By the 1930s Bush was working on analog computers. These were large mechanical devices that looked quite different from today's digital machines. They actually used large gears and other mechanical parts to solve equations. In 1931, he completed the first differential analyzer—a machine that was used to solve differential equations. Bush also worked on developing machines that would automate human thinking and proposed to build a machine for the FBI that could review 1,000 fingerprints a minute. They turned him down. But he continued to pursue his latest vision. Bush called his device a rapid selector. It was plagued with technical problems and hindered by the state of current technology, but he was among the very first to attempt to build a personal information processor, and these early experiences provided a solid base for his landmark article, "As We May Think."

Published in 1945, the article describes a theoretical machine called a "memex." It was an obvious extension of Bush's earlier work with the rapid selector. The memex was also to be a storage and retrieval device using microfilm. It would consist of a desk with viewing screens, a keyboard, selection buttons and levers, and microfilm storage. This system is remarkably similar to modern hypertext. In fact, Ted Nelson, who coined the term "hypertext" in the 1960's, said: "Bush was right," acknowledging his debt to Bush.

Vannevar Bush died on June 30, 1974, years before the Internet became widely popular or the worldwide web even existed. With the growing popularity of the internet, many now look back through its history and see Bush as a visionary. Even when Bush was alive, he seemed to always be looking toward the future, or perhaps he saw the present a little differently than most of us. He was fond of saying, "It is earlier than we think."