

## Grace Hopper: Pioneer of the Information Age

By Kristia Cadavero

It's not everyday when someone gets the highest award possible for his or her work. It's especially unusual when that someone is a woman who worked in a field dominated by men. But to Grace Hopper, such distinctions were transparent; nothing could hold her back from anything she wanted to do.

Grace Brewster Murray was born on December 9, 1906. She spent her summers in Wolfeboro, New Hampshire (where she met her future husband), and apparently had a very happy childhood. Compared to today, Grace's schooling was much stricter; she even had to do homework over the summer.

Grace graduated from Vassar College in 1928 with a Phi Beta Kappa membership. She received her M.A. at Yale University in 1930 and married Vincent Foster Hopper that same year.

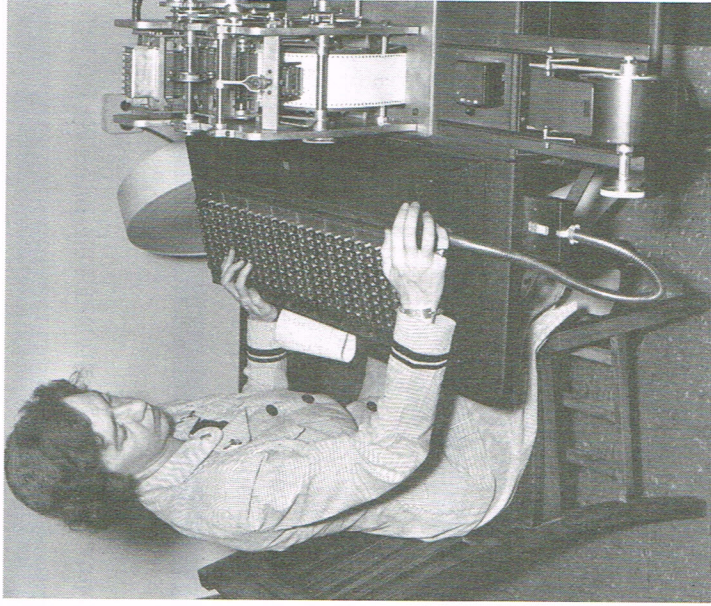
During the years 1931–1943, Grace taught at Vassar in the Department of Mathematics and

received a Vassar Faculty Fellowship. In 1934 she earned her Ph.D. from Yale in mathematics. But Grace still felt compelled to continue her education, so she studied at New York University during 1941–1942. She became an assistant professor of mathematics at Barnard College in 1943, then enlisted in the U.S. Naval Reserve (USNR) because of the war. Her husband died in World War II in 1945, and Grace, with no children, continued in her career.

When Grace graduated USNR Midshipmen's School-W in Northampton, Massachusetts, she was commissioned Lieutenant. She was ordered to the Bureau of Ordnance Computation Project at Harvard University and worked on Howard Aiken's Mark I, II, and III computers for the Navy. In 1946 she joined Harvard as a researcher in engineering sciences and applied physics. It was there that the term "debug" became en vogue, reportedly when a moth got stuck inside the computer and caused the computer to "crash."

In 1949 Grace worked on programming Univac I, the first large commercial computer, which the U.S. Census Bureau began using in 1951. In 1952 she published a paper on compilers and was appointed systems engineer director of automatic programming in the Univac Division of the Sperry Rand Corporation. Throughout her career she published over fifty papers on software and programming languages.

The Department of Defense, in 1959, sponsored the Conference on Data Systems Languages (CODASYL). The outcome of this conference was the CODASYL committee, of which Grace was an executive member. The committee strove for the development of a programming language convenient for business applications, which consisted of a set of symbols, letters, words, and numbers used for giving instructions to a computer. Grace helped enormously with this development because she believed that programming languages should be more like everyday instructions so many people could use computers. She invented



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terns, manage energy resources, and increase agricultural output. More than a decade later one can recognize her foresight. Grace acquired many awards and fellowships, and she was even awarded the National Medal of Technology, the nation's highest honor in engineering and technology, by President George Bush in 1991. But Grace felt that her greatest contribution was the youngsters she had trained and taught.

Grace died in Arlington, Virginia, on January 1, 1992. Because of her continued duty, service, and loyalty to her country, she was buried in one of her country's most sacred grounds, Arlington National Cemetery. Her plain white granite headstone can be found in Section 59. Engraved is her name, dates of birth and death, rank in the Navy, and the three wars in which she served: World War II, Korea, and Vietnam. As with all veterans, a presidential wreath adorns her grave every Memorial and Veterans Day.

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a system of translating common language into instructions computers could process. The CODASYL committee named the language COBOL (Common Business-Oriented Language).

COBOL quickly became a widespread procedure-oriented language. One of the reasons could have been because the government required that all computers bought or leased by the government be able to use a COBOL compiler. Today COBOL is still used in commercial and government computer installations.

In 1966 Grace retired from the Naval Reserve with a rank of Commander in the Retired Reserve. She was recalled to duty in 1967 to help standardize the Navy's computer languages and promoted to the rank of Captain on the retired list of the Naval Reserve in 1973. She retired again in 1986, this time an eighty-year-old Rear Admiral, the nation's oldest active-duty officer.

During the early 1980s, Grace predicted that computers would be used to predict weather pat-