



# Electronic Wheel Cipher is Added to Monticello Site

Three computer science students at the University of Virginia have created an electronic version of Thomas Jefferson's Wheel Cipher that allows visitors to Monticello's Web site to encode and decode short messages and send them via e-mail.

The three students – Matthew John Spear, Chalermpong Worawannotai, and Edward Mitchell – created the electronic Wheel Cipher as an assignment for a class taught by Professor David Evans. Using Java, a programming language designed to work in any browser, the three designed the electronic version according to Jefferson's descriptions of the physical model found in two undated manuscripts at the Library of Congress.

Jefferson created the Wheel Cipher around 1790 to provide a more secure means of delivering sensitive messages. He described it as a cylinder of 36 numbered disks, each having the letters of the alphabet inscribed randomly along the outside. By rotating the disks individually, the sender would spell out a short phrase along one row, tighten the disks together with a bolt, and copy any one of the other rows of seemingly random letters to send as the encoded message. As long as the recipient had exact copies of each disk in the exact same order as the sender, the original message would appear when one row of the cipher was set to the encoded letters. The recipient would only need to rotate the entire device to see it.

"It was very advanced for its time and effectively unbreakable until electronic computers were available," Evans said. "The U.S. Army used a very similar cipher, developed independently, as recently as World War II."

Despite its strength, there is no evidence that Jefferson ever used the

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# MONTICELLO



## Electronic Wheel Cipher

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cipher. No historical examples of the device or any messages encoded by one are known to exist. But Jefferson's descriptions of the Wheel Cipher are believed to be the earliest known, and he is now considered its inventor.

The electronic Wheel Cipher and instructions on how to use it are accessible at [www.monticello.org/jefferson/wheelcipher/index2.html](http://www.monticello.org/jefferson/wheelcipher/index2.html).

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