UNCATEGORIZED

# Cybernought

The founder of cybernetics is largely forgotten. That's a pity.

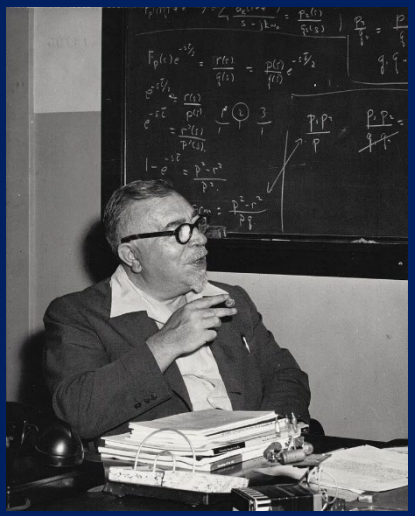
By Mark Williams Pontin

June 1, 2005

**Though Norbert Wiener was one of those 20th-century illuminati who ushered humankind** into the age of intelligent machines, few people today know much about him. So whatever prompted Flo Conway and Jim Siegelman to write *Dark Hero of the Information Age: In Search of Norbert Wiener, the Father of Cybernetics,* it wasn't any expectation of a bestseller. Wiener is past all likelihood of rescue by fashion. The authors must simply have been drawn to their subject by one of those virtuous impulses that are their own reward.

*Dark Hero*, Conway and Siegelman claim, was "eight years in the making and a dozen more in the planning." Alas, while their hearts may be in the right places, these authors turn out to be unable to think deeply or write well. Here, for instance, is the book's fourth paragraph: "This is the story of a dark hero who has fallen through the cracks in the information age and of his fight for human beings that is the stuff of legend." Things don't improve after that. For some months, however, *Dark Hero* may provide fodder for columns like this one. So while this inadequate book provides the occasion, let us seize it.

Let us recall the thought and life of a man who, though not conventionally heroic – since he was short, stout, myopic, physically clumsy, and so socially maladroit that he could pick his nose while delivering a lecture – nevertheless combined brilliance with such determination to behave ethically that those who know his work or writing still feel fond admiration for him.



Both Norbert Wiener's greatness and his flaws were tied to his lifelong sense of himself as an outsider. In particular, he bore the burden of having been a child prodigy. Born in 1894, Wiener entered Tufts University to study mathematics at 11, graduated at 14, and proceeded to Harvard University, completing a dissertation in mathematical logic at 18. Thence, he embarked for Europe for postdoctoral study under Bertrand Russell and the mathematicians G. H. Hardy and David Hilbert.

In 1919, at 24, Wiener joined the MIT mathematics faculty. In the 1920s, he provided a mathematical description of Brownian motion – the arbitrary movement of microscopic particles suspended in a liquid or gas. Albert Einstein, in one of his seminal 1905 physics papers, had attributed Brownian motion to random collisions between the suspended particles and molecules in their environment. By marrying Einstein's work with that of French mathematician Henri Lebesgue, Wiener was able to describe the probability with which any of the particles would follow a particular trajectory. His work yielded the so-called Wiener measure, which has since found practical applications in many branches of physics, engineering, and biology.

During World War II, Wiener made a brilliant contribution to the science of fire control for antiaircraft guns – essentially, the computation of a fast-moving aerial target's future position. Building on his prior work on the statistical description of trajectory, Wiener produced probabilistic equations that, embodied in crude World War II–era analog electronics, could translate radar information about a target's motion and distance into a prediction of its flight path and automatically swing a gun in the right direction. To improve the gun's aim, engineers relied on a "feedback loop": a reading of the gun's position was converted into an electrical signal, which was compared with the original command signal. The gun was then moved to close the difference. The implications of this technique weren't lost on Wiener.

Today, self-correcting mechanical systems surround us. So it's hard for us to appreciate the impact of Wiener's ideas in the mid-20th century, when he pointed out the similarity between machines with sensory systems that collected information to fine-tune their behavior and biological systems – like human beings – that did the same thing. Cybernetics – Wiener's theory of "control and communication in the animal and the machine" – made him a cultural figure prominent enough to be featured in *Time* magazine cover stories.

After 1945, Wiener opposed the military-industrial complex's increasing influence on scientific affairs. As a result, he became estranged from many of his colleagues and from developments in automation and computer technology. "So long as we retain one trace of ethical discrimination, the use of great powers for base purposes will constitute the full moral equivalent of sorcery and simony," he wrote in 1963, the year before his death. Norbert Wiener believed that scientists and technologists had an ethical responsibility both to the truth and to humanity; through all his life, he attempted to meet the terms of that contract.

*Mark Williams is a writer who lives in Oakland, CA.*