The Inner Turbulence of Genius: Norbert Wiener


In reviewing this biography of Norbert Wiener—the fifth to appear, by my count—this book included two autobiographies—I thought that the man, his work, his legacy would be so well known to readers of SIAM News that I could get away with discussing only his political and humanistic beliefs and actions. But no. Just to put the matter to a larger SIAM member, he disputed me of this opinion, quoting the Book of Exodus—"And there arose a Pharaoh who knew not Joseph"—and then amplifying the quote by pointing out that younger people, born after Wiener’s death (in 1964), knew the name only as a descriptive adjective. This being the case, I begin by recalling a few of the adjectives.

We have the wiener process—and I use the lower-case “w” as befits theories that have attained the mathematical Valhalla—so making the wiener integral, the wiener–höflich equation, pailey–wiener theorems. Have I forgotten some? Forgive me, let me add the wiener extrapolation of linear time series, his generalized harmonic analysis, and his work on tauberian theorems, and then let’s ask the question again.

It was Wiener who gave the word “feedback” its current mathematical (twist, whirl, curl, S as in “S is for stuff” under current vocabulary, to the extent that every child who watches TV or plays with a computer seems to know what the cybernetics concept cyberspace is: I’ve even seen fast food shops advertising “cyberburger,” without any accompanying definition as to what they might be. Were Wiener to return to earth, he would be revolted by this commercialization of the neologism he invented.

Despite these fundamental contributions to pure and applied mathematics, the human being from whose brain these ideas sprung remains vaguely known. Even the publisher, in a dustjacket blurb, admits that the passage of time has mellowed over Wiener’s image:

“Award-winning journalists Conway and Siegelman [have set] to rescue Wiener’s genius from obscurity. (My italics.)”

If you are looking for formulas and theorems, I suggest Masani’s 1989 Norbert Wiener. If you are looking to learn about the man, note that Steve Heinz’s (although the balance between the digital and the analog has shifted since the book was written). But if you are looking for the first time to understand the blood Wiener, you will find it here—not just Wiener the tremendous brain, Wiener the icon, Wiener the gauche and unautiful (alaugable eccentric to some, but not to me, feeling students of thought of him). Or Wiener the short, stocky man, bearded in a blue shirt with a few beards, waddling through the halls of MIT popping peanuts. If you are looking for the human face of the mat, then I highly recommend the book under review. There are


Sleeping in the Front Row

IWiener had a reputation for sitting in the front row and fallen asleep during colloquia and similar seminars. Inevitably, at the end of a lecture, he would awaken and ask a relevant question about something I was saying.

Thus there was the AMS session at the University of Chicago (or maybe it was at MIT). The participants, John von Neumann, R. R. P. Sprague, and Wiener, were seated side-by-side on the stage. Sprague had a long red beard, forked at the end, which he constantly stroked to pull it together. Von Neumann, as he habitually did in such settings, talked to himself at the front, instructing his lower class. Wiener, as usual, slept through the others’ talks.

The sleepiness

A student had been accepted by Wiener as a PhD candidate. The student had requested a topic having to do with interpolation, extrapolation, and smoothing of time series. Wiener agreed to the project and made a date with the student to frame the topic. A week later, an exasperated Wiener posed a topic in number theory, far from the student’s interests. The student politely excused himself from the project.

To end more respectfully, here is a note on Wiener, attributed to SIAM, that appears in the front matter of Selected Papers of Norbert Wiener, 1945:

Professor Norbert Wiener (1894–1964) believed that significant research topics are to be found in the "crack" between two fields. Too involved in one of these areas—say economics or engineering— Leads to a loss of intellectual curiosity. Wiener started over on the problem. When he reached the point of the error, he made exactly the same error and proceeded to finish the proof. Q.E.D.

One new biography looks beyond Norbert Wiener "the tremendous brain ... the icon ... the eccentric" to the dizzying brain and—yes—eccentric, but also Wiener the rebel, the quarry of the McCarthy witch hunters, the humanist, and the family man living with a somewhat paranoid wife who had strong anti-Soviet and Zionist political and social tendencies.

We read about Wiener the son of a comparatively poor and depressed, the man avid for love, and jealous and zealous, deeply disturbed about the reputation on earth and his ultimate position in the pantheon of science. But the title of this book, by Conway and Siegelman also shared, without stint, his path-breaking ideas with the scientific community. We read, too, about Wiener the seer, the prophet, the poliologist, the novelist.

Here also is Wiener the self-promoter. He bought himself a lot of Hollywood with his novel Temple of the Tempest, whose plot is based on the story of Michael I. Puppo of Cold War fame; he spent all the fame and money from an invention that Oliver Heaviside had patented, leaving Heaviside to obscurity. Wiener’s character, I was told, was always self-promoting, but Hollywood decided (I’m sure accurately) that little money could be made from a drama about an inventor developing a scientific idea. Would the story have been picked up if Wiener had gratuitously added a female fate? Ah yes, the desire for fame is frequently seductive.

Another episode recounted by Conway and Siegelman is the sudden break-up of the collaborative group comprising neurobiologist Warren McCulloch (1898–1969), mathematician Walter Pitts (1904–1969), a brilliant autodidact, and neuroscientist Jerome (Jerry) Letvin: three bright planets revolving around Wiener the Sun. This catastrophic break was instigated by Wiener, suddenly, without warning. It led to a long depression for McCulloch and to the creation of the MIT group around Pitts. What brought on this discontinuity? I believe that Conway and Siegelman have told the story in the first time, and I leave the curious to satisfy their inquisitiveness by reading what the authors themselves did. Did I read about other aspects of the life of Norbert Wiener, the man, that I was not aware of before? Certainly one such aspect is the intensity of his psychological ups and downs, described here in almost embarrassing detail. Could Wiener be better classified as Asperger’s syndrome? Lists of candidates for Asperger’s are long. Dr. Asperger (Vienne, 1944) himself thought that he should have mathematics on a two-touch of it.

I turn finally to Wiener the Rebel and Wiener the object of the McCarthyist attack during the post-War World II McCarthy era (1947–1954). Though I knew a number of mathematicians and scientists who had been severely damaged, I had not realized until I read the two chapters the authors devoted to this period that Wiener was badly damaged. More briefly, this is Wiener thought about all things with extraordinary—almost de- nihilating—intensity. Early on, after the end of WWII, he resolved that he would not carry on any military-connected research. He stuck rigidly to this resolu-

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I Remember Well

The Subject: Norbert Wiener.

Philosophy of Mathematics, MIT.

The Setting: Graduate School at Harvard, with Classes at MIT.

The Time: Circa 1950.

In a word, Wiener was not always perfectly, my days as a graduate student at Harvard. Phil Davis was there at the same time, and occa-

sionally we would audit courses at MIT (Levinson, Pitts, and Wiener, and possibly others).

I especially remember a course that Wiener gave, on material in Paley–Wiener (Fourier Transforms in the Complex Domain), in the late morning, once a week. The course was stimulating and exciting, mostly because of Wiener’s great enthusiasm in talking about real topics in the then evolving world of technology and medicine.

Wiener was a sensitive man, seemingly alone in his own world, but (maybe) very much in touch with his surroundings when a topic—captured his attention. The thing that put him circulated among us grad students to those days was his sure foot. There are a few of them: I note that maybe not so sure.

To visit Brown

On Thursday afternoon, Wiener traveled to Brown to attend Brown’s regular monthly seminar. Notwithstanding his poor eyesight, he sometimes drove, other times rode bike or train or got a lift. One time he forgot that he had driven and returned home by train. It wasn’t until a few days later that he rose to his garage for his car and discovered it missing. He reported the theft to the police. Several days later it turned up in a Brown parking lot.

tion. We all knew that this was the case. Most mathematicians respected his choice and then went off and did what they wanted to do.

As a student in Cambridge at the time, I had very little interaction with Wiener. I used to see him at colloquia and meetings. On November 28, 1949, in the Macmillan Auditorium of Columbia University, Wiener gave the 23rd Gibbs Lecture of the American Mathematical Society. I expected something like a discussion of Laplace's theorem or generalized harmonic analysis. But Wiener had other priorities. In a talk titled "Problems of Sensory Perception," he described the use of feedback mechanisms in the construction of artificial limbs. Here, indeed, was mathematics that seemed to have the potential for human values. I was sitting in the first row, next to Bob Finn (Stanford University), taking it all in. I don't recall Wiener writing a single equation on the blackboard behind him. He straddled back and forth on the platform, talking away and ignoring a backer in the gallery who, midway through the lecture, called out, "Wiener, where's your mathematics?"

Ed Block and I audited one of Wiener's courses in the spring of 1950. Wiener would pace in the middle of writing an integral on the blackboard and rail against the media for all the misinformation and trash they were publishing. I have learned from the book under review that his spirits were then at a very low point.

Wiener was crowded against allowing the computer to become a Golem, a device that, once started, cannot be turned off, come what may. He predicted, based on his cybernetic outlook, that rigid, top-down political structures that allow no negative feedback—such as the Soviet Union—would face collapse. He maintained that society should not be based exclusively, as it seemed to him, on consumption, property, and money.

In 1950 he came out with the book The Human Use of Human Beings, which aired these views. A half century after Wiener wrote, society has not yet found a way to heed his warnings.

Wiener subscribed to the notion that scientific information should be totally available. He would have found repugnant the current practice of mathematical formulas and codes being subject to royalties. But whose behavior is totally consistent? In late 1948, he refused to grant Boeing Aircraft access to his classified "Yellow Peril" manuscript.

While holding these views, Wiener had a vast number of scientific and technological acquaintances at home and all over the world, whom he saw and corresponded with, regardless of their political or social orientations. It was almost inevitable that he should have found himself in the crosshairs of the Red hunters. Wiener, the naive dove, became a discredited suspect. By the end of 1954, with the censure of Senator McCarthy, things went downward considerably, and Wiener was in the clear. His years of anxiety are described here in some detail.

The authors not unreasonably call the present age Wienerian, but I prefer to call it the age of increasingly intermingling mathematicalization. In so designating it, I include other gentlemen and also the hundreds—say, thousands—of scientists and technologists on whose shoulders their genius was brought to fruition.

"The Extrapolation, Interpolation and Smoothing of Stationary Time Series"

"C.1. Legacy of Norbert Wiener: A Special Symposium in Honor of the 100th Anniversary of Norbert Wiener's Birth, October 8–14, 1994, AMS"

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