

Paperboy: Confessions of a Future Engineer

By Henry Petroski

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In his tenth book, Dr. Henry Petroski, Professor of Civil Engineering at Duke University, (and a professor of history, too), describes in often-overwhelming detail his childhood from age 12 to 16, in New York City. The personal vignettes on these pages make clear why the book is dedicated “to my family, then and now”, but the main subject is the fundamental question, what guided him into an engineering career.

The excruciating detail of a long series of seemingly-random events may frustrate or baffle a reader. The obsessive trivia can get somewhat overwhelming. Sometimes a reader will wonder why they should care about many incidents which Petroski makes clear he himself didn't much care about at the time.

But through this approach, Petroski captures the nitty-gritty of his life on the verge of young adulthood, although he does in the end admit that “the names of all my friends and teachers are of my own creation, and their characters are composites,” with equally fictitious “names and locations of places of business.” But this book is more a portrait of a culture that shaped his life, not a personal biography, and from my own memories I recognize that portrait as absolutely authentic.

My own early teen years followed a remarkably parallel path with Petroski's. Two years younger, I lived in the northern suburbs of New York City, not as he did at the eastern edge of Queens on Long Island. Both of us had previously lived near Prospect Park in Brooklyn, within earshot of Ebbets Field, home of the Dodgers. As a teenager, he delivered the ‘Press’, while I delivered the ‘Reporter Dispatch’ from White Plains, and we both learned how to fold a throwable paper. We both cherished our bicycles and maintained them well or indifferently as time and inclinations passed, we both took a risky long biking expedition that terrified our parents, and we both often had pants cuffs caught between the chain and sprocket.

We both played with electric trains and built plastic airplane and automobile models. We both studied Latin in school (but I liked it, maybe since I wasn't compelled to take it), and enjoyed Good Humor trucks and Ebinger's Bakery stores and Mad magazine and summer days at Jones Beach. We both listened to Jean Shepherd's hypnotic late night verbal ramblings on WOR. We both suffered from the Asian flu epidemic in the fall of 1957 that coincided with the shock of the Sputnik launching.

Petroski describes how he worked in a bike shop, repacked his own bike axle bearings, was fascinated by mechanical gizmos in his mother's kitchen and his aunts sewing studio. At Ebbetts Field, as he grew older, he “became increasingly more engrossed in the steel structure of the upper deck than in the game on the field.” From a hospital window after a

concussion from a biking accident, he watched traffic patterns on the streets and saw “technology in motion”.

These and many other chronicled minutiae provide a context for the stirring of Petroski’s mind toward mechanistic causal sequences. It takes 102 pages, but he then begins to provide explanations with such statements as, “Frustration and disappointment with things as they are is the essence of invention and of progress.” Why the book’s title? “As with a lot of what we reflect upon years later in the abstract, the act of folding a paper became charged with symbolism. . . . Did noting such evolutionary developments in basically technological processes, done first when I was a paperboy, later contribute to my thinking about engineering, design, invention, and the evolution of artifacts generally?” he writes. “I expect it probably did. . . . I was an engineer long before I understood all the connotations of the word.” Watching his father and uncle build a new closet, he marveled at how the structure took shape from its parts. “This was design and engineering, words that were not yet in my vocabulary, but processes with which I was clearly fascinated and to which I was drawn.” He also thought of poker as a process of assembly of a winning hand, and this image launched him into a 2-page florid metaphor of poker and life.

Halfway through the book, Petroski has accumulated enough images to begin making unexpected comparisons, and matchups of novel ideas, between his childhood experiences and his engineering career. With hindsight into his feelings and choices as a 15-year-old, he introduces ideas about the values and the drawbacks of habitual behavior, precision work, and deep detail.

Although sometimes bored by the predictability and repetition of the paper route, he mused in hindsight that “repetition is part of our nature and in the nature of things, and we succeed in our human endeavors by mastering the art of repetition.” Even at the time, he “began to see [it] as a refuge of rationality and stability.” But “as with everything else in life, the totally predictable is indistinguishable from the totally boring.”

His own life (and mine) defied predictability due to the unpredicted launch of Sputnik on October 4, 1957. After that blow to the US national psyche, the country rallied to mount a response. His teachers identified him (and mine did me) as candidates for accelerated technical training classes.

For example: “My enjoyment of mechanical drawing became evident in this course, as did my ability to visualize things in space,” he wrote. The class “should have given me my first inkling that I would become an engineer.” He had enjoyed algebra as “puzzle solving”, and had excelled in math classes, but had drawn no implications from that experience. However, in one advanced math class, he and his classmates were invited to assemble an analog computer kit, but they discovered they couldn’t. What was missing, Petroski realized later, was “something a mathematician could not help us with. That extra something . . . was engineering.”

This is a key theme: “Educators wrongly equated science and engineering, thinking of the latter as following from the former.” But he argues powerfully that this just isn’t so. “The engineer had to supply these missing elements, by being an inventor, an improviser, a conjurer, a diviner. Where and how one developed all these talents was mysterious. . . but they came more from playing with electric trains and bicycles than from playing with bats and balls. It had more to do with being a paperboy than with being an office boy.”

Petroski elaborates: “Engineering, as I would learn, is neither math nor science. . . In its most basic form, engineering is the synthesis of things, as a working computer comes out of the idea of a computer and its parts, or as a three dimensional bicycle comes out of a flat box of its parts.” Earlier in the book, he had explained it this way: “As a poet can see a world in a grain of sand, so an engineer, even a budding one, can see a bicycle in a ball of steel”, or a box of bicycle parts that he intuitively assembled himself. Petroski’s philosophy is also reflected in the way he built this book, which a little too often reads like a engineering equipment catalog or technical school class syllabus, but which does in the end tie together very nicely into an impressive insight into what can lead a child into a career in engineering – or at least, did in the 1950s.

This raises some questions – what does it imply about stimuli now influencing young American boys and girls towards engineering? Compare the long-range harvest of the culture of the 1950’s when “technology was growing increasingly attractive, important, and humbling to me and to the country”, as he writes on his first page of narrative. He recalls “smart looking” engineers with comfortable working conditions, pictured in magazine advertisements. This nourished mechanical aptitudes. Then consider today, when popular movies from ‘The lord of the Rings’ to the recent remake of ‘The Time Machine’ to the latest ‘Star Wars’ portray the machine-builders literally as evil sub-humans.

Do enough kids still build electronic kits or mechanical gizmos with their own hands? Fifty years from now, what will emeritus engineers look back on as sparking their own interest in the field? From the richly-detailed narrative of his own life, Petroski generalizes and then leads readers to leap forward to wider speculations along a conceptual bridge of his own careful crafting. It’s a fine piece of intellectual engineering!