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Samuel C. Florman's *The Existential Pleasures of Engineering* is a book you should have read about twenty years ago. However, if you haven't read it, it is not too late to read it now. I say you should have read it twenty years ago, because it is most valuable as an inspirational book for the young engineer, perhaps in the second or third year of undergraduate studies. Reading Florman's book can create a permanent impression of the sheer wonderfulness of engineering that can last a lifetime. When I mention this book in my undergraduate classes, I propose it as encouragement to the discouraged, further intoxicating drug to the enthusiastic, and shield against a world that sometimes disparages the greatness of the enterprise of software engineering at its best. Come to think of it, perhaps now would be a better time to read Florman than twenty years ago; yes, your youthful self would be energized, but don't you need a pep talk now? Don't you sometimes grow discouraged, unconvinced your software creations are really contributions to the common good, exasperated with the effort, disenchanted with the stereotype of the uncultured, perhaps unprincipled, software maker?

What is *The Existential Pleasures of Engineering*? What *are* the existential pleasures of engineering? What, for that matter, is existentialism? The book, first published in 1976, and revised and expanded in 1994, is in some ways difficult to describe. It begins with a description of the Golden Age of Engineering, when the engineer was the hero of society, lauded in popular fiction (even Zane Grey, the ultimate pulp cowboy-story purveyor, had an engineer "wild for adventure, keen for achievement, eager, arden, bronze-faced, and keen-eyed" -- doesn't that describe you and I with verve and accuracy?), the builder of bridges, the maker of society, the savior of mankind. In the first chapter, we see Robert Louis Stevenson describing the construction of a railroad: "If it be romance, if it be contrast, if it be heroism we require, what was Troy to this?"

Florman quickly but compellingly evokes the popular enchantment with technology and engineers that arose even during the squalor of the early Industrial Revolution (there was nothing squalid about the Crystal Palace exhibitions of 1851) and persisted until after the Second World War. Just reading about the can-do confidence of the early engineer, the indomitable spirit and (perhaps lunatic) conviction of the early technologist that engineering can bring an earthly paradise, when described here, can produce a fire in the belly for today's engineer. In theory, Florman could have just continued to work out this theme, and left the reader both inspired and sadly nostalgic. Such a book would be valuable, but not as memorable or important as what Florman actually set out to do.

Instead, the Golden Age is presented as prelude to decline and fall. Florman traces much of the tarnished reputation of engineering to the environmental crisis in particular, but more broadly as a product of hubris. Engineering is extraordinary and admirable; it is not panacea, and the public both expects too much of, and places too much blame on, the engineer as such. Florman's second chapter describes the end of the Golden Age, and the call for more responsible, better, engineers, who will not pollute the planet, build terrible weapons, or do

anything else disreputable. Florman, born in 1925, says that from childhood he had dreamed a "paradise modeled after the TVA" and found in the 50s and 60s that writers like John Brooks now saw engineering's "prophecies of heaven" more like the "lineaments of Hell."

In the third chapter, Florman (in my view) partly digresses, though the digression is worth reading. Given the heaven engineers once "promised" and the "hell" that some think they have delivered, a cry has arisen for *moral, responsible, conscience-driven* engineers. If engineers only had standards, only had responsible professional societies, only had *ethics*, only could escape the profit motive, they would all agree and never again turn to war, or pollution, or other wickedness. Florman argues, first, that to expect engineers (or their professional societies) to adopt a single, monolithic view on complex social phenomena and political priorities is absurd and intolerant; engineers have long had codes of conduct and an aim to serve the public good, but many "reformers," he argues, want to do away with diversity of opinion. Second, he shows that many of the crimes blamed on engineers are in fact simply the result of public and political will, not the outcome of sinister engineers plotting pollution and war.

This chapter paves the way for the second part of the book, a refutation of the views of a group Florman calls the antitechnolgists: Jacques Ellul, Lewis Mumford (a traitor, even, in that Mumford was once a great historian of technology), Rene Dubos, Charles Reich, and Theodore Roszak. Refutation of these thinkers is probably less urgent now than in 1976 when this book was first published. Mumford is remembered for *The City in History*, and I sometimes run across a mention of Ellul, but these are not thinkers who dominate current thought about technology, in my experience. However, the aspects of antitechnology ideology persist: belief in technology as demonic and independent of human action (a notion dating at least to Thoreau's "men have become the tools of their tools"), a disdain for the enjoyments of the masses (to like Disneyland is to be a slave of technology, to enjoy motor-sports is a sign of barbarism), a totalitarian inclination, an idealization of the labor market of the peasant or Medieval world, and a notion that, rather than potentially being perverted by human fault, technology is inherently opposed to transcendence, nature, religion, spirit, freedom, and all else that is good. If it's refutation you want, this book does a good job of it, and in a literary and sprightly (and spitely) way that is as enjoyable as the description of the Golden Age of engineering.

What is all this leading up to? In the second section, there is a mention of Dostoyevsky and freedom (the antitechnologists admire *Notes from the Underground* but don't seem to understand it very well), but existentialism still hasn't actually appeared on the scene. It is in the third section of the book that Florman justifies his title.

Florman assumes he has successfully defended the engineer against the charge of being evil, and has demonstrated the fallacies of the antitechnology crowd. Nonetheless, there is something unattractive about the picture of the engineer that remains. The engineer is "practical, analytical, and nonemotional." Engineers are "middlebrow in their tastes," they "would rather deal with things than with human beings," and they altogether do "appear to be a drab lot." Florman tells us that it is hard to see today's engineer as connected to the "zealous,

proud, often cultured, and occasionally eloquent" heroes of the Golden Age. Now, there is something amiss here: novelists such as Thomas Mann and Walker Percy, when they need an innocent who is also able to transcend the mundane, a protagonist who has to be curious and even ignorant in a heroic way, reach for an engineer as hero. But this is not the popular perception (the software engineer will nod along here: we may make money, and be cool now that we make a lot of money, but this is not far from the current view of our kind). Florman wants heroes. So he sets off, after the first chapter noting that engineers are not, at present seen as (and maybe for good reason), heroes, in search of "an engineering philosophy for our age." Florman wants a philosophy for heroes.

Florman finds that philosophy in his idea of existentialism, and states his central thesis, finally:

"My proposition is that the nature of engineering has been misconceived. Analysis, rationality, materialism, and practical creativity do not preclude emotional fulfillment; they are pathways to such fulfillment. They do not 'reduce' experience, as is so often claimed; they expand it. Engineering is superficial only to those who view it superficially. At the heart of engineering lies existential joy."

This is where Florman really gets going -- unlike the earlier nostalgic (but perhaps laden with hubris) celebration of the "Golden Age," he now connects the glory of engineering to human history on a much wider stage, from Homer and the Bible to Camus, and goes beyond a limited and naive optimism to joy in the engineering itself, as well as its benefit to mankind. Startlingly, his new model of the joyful engineer is Sisyphus, "struggling, questing, and creating." The remainder of the book is frankly joyful -- exuberant in searching out literary sources describing the engineer's relation to "the machine" (not as servant, not as foe, not as master, but in a chapter properly titled "Look Long on an Engine, it is Sweet to the Eyes"), the engineer's flat-out euphoria and ability to be "carried beyond pleasure." This is heady stuff, and it is better than a Golden Age of bridge-builders because it is permanent, not the thing of a single age of history.

The 1994 edition of the book includes a postscript of four essays from Florman's less well-known books. All four are interesting, but it is the liftoff of the section on the existential engineer that will allow the engineer (including, of course, the software engineer, who shares in this beauty and joy perfectly, with no dispute to be made about whether we are "really" engineers) that makes this book a classic. Don't wait for twenty years ago; go read it now, or reread it. You have only your ennui to lose.