

Engineering People – Thomas Hughes’s *Rescuing Prometheus*
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In his discussion of four large-scale systems projects during the post-war era, Thomas Hughes threatens to create a way of understanding engineering that subsumes every type of engineering, along with the history of engineering and technology, under the umbrella of the “systems approach.” While reading I often found myself understanding in some intuitive way why and how the projects he had selected were unique, but simultaneously wondering what *isn’t* considered a system, or how the concept of systems in both engineering and social contexts has changed over time – what were systems before SAGE, before Atlas, and before the Big Dig? We make the leap in his narrative from ancient Egyptian pyramid builders as systems builders to the SAGE project without a deeper understand of what lies in between. Considering that this constitutes thousands of years of engineering projects (some of which, like railroads and rural electrification, which Hughes has written about elsewhere, would seem to qualify as “large”) it’s a gap I’d like to see filled in order to put these four projects in context.

That said, his focus on SAGE, Atlas, the Big Dig and ARPANET as exemplars of modern large-scale systems engineering projects is convincing if for no other reason than that they appear to have spawned a methodology that is now quite familiar to us. The layering of management in between engineers themselves and sources of funding, executive bodies and so forth can be seen in a variety of contexts from the small business to the large corporation. Specialization among technology companies and ongoing collaboration between otherwise competitive businesses to solve technical problems (for example, the collaborative work between Daimler/Chrysler, GM and BMW on next generation hybrid engine technology for automobiles) feel like echoes of what Hughes

has expounded upon in this book. Though not the same size or necessarily generated from the same source, these types of projects to me seem like the natural outcome of the successes of projects such as Atlas. Engineering companies such as BMW do not necessarily rely on doing everything themselves anymore, and though I have no expertise in the area of automobile manufacturing, it would seem perfectly reasonable if their business model has been updated over time to make room for the type of collaborative engineering projects that could stem from the conceptual and methodological insights produced by the projects Hughes describes.

Less satisfying is the absence of a more thorough exploration of what seems to me a rather critical aspect of all these projects: people. Though there are certainly stand-out characters in the retelling of each project, the “engineer” remains rather faceless. I was curious to know in more detail how these new approaches to engineering affected the culture and everyday lives of the engineers themselves. I feel like we can get a sense of how management was affected and generated through these projects, but what about, say, mechanical engineering as a discipline? On a related note, did the rise of systems engineering cause disciplinary boundaries between different types of engineering to become blurred (or brought into sharper relief)? Granted, Hughes is focused primarily on systems engineer as a discipline in and of itself, but you can’t have systems engineering without other types of engineering to comprise your system.

Also missing was a more critical look at “systems dynamics” and OR as applied to social systems in his chapter titled “Spread of the Systems Approach”. I found this chapter to be, awkwardly, the most interesting and most unsatisfying part of the book. It was almost as if he established what systems engineering was in the context of technical

projects, took a detour to say, “look at how loony things got when they tried to employ these techniques to manage people!” then returned to his largely technical focus without ever really observing what stood out to me as the central problem with the systems approach as applied to social problems: people are not technologies, nor can they be managed like technologies. People could, as individuals, be viewed as systems in and of themselves, and perhaps if that had been the approach rather than treating them as cogs that will respond in some predictable way to technical management practices. The whole idea that, as Alain Enthoven put it in response to criticism regarding the handling of the war in Vietnam by McNamara’s Defense Department, the problem was not over management but under management – that if the systems approach had been applied more forcefully rather than less so the same problems would not have arisen – rings false. People and society are too complex for such a simplistic explanation to hold water, and I would have liked for Hughes to have examined that more thoroughly, or made stronger connections between the successes and failures of a systems approach to solving social problems in his discussion of the Big Dig, which unlike the other projects was notably public and generated strong reactions from various social groups.

So should people have figured more prominently in this book? Where are the disciplinary boundaries between various types of engineering within engineering systems? This might seem like silly questions to some of you, but not being an engineer myself I’m curious to know more about how these things play out in engineering training and in large projects that are the inheritors of the projects that Hughes focuses upon in this book.