

ON THE VICTORIA EMBANKMENT IN LONDON, THERE'S A

statue of an engineer. Isambard Kingdom Brunel advanced the state of the art in railroads, in tunnels, in bridges, in long-span buildings, and even in steamships. We will almost surely never see his like again: technology has advanced so far that no one person can excel in so many fields. We also won't see an engineer capture the public imagination as Brunel did.

The era of the heroic engineer began early in the 1800s with road and canal builders like Thomas Telford; it moved on to railroad builders like John Stephenson, structural engineers like Gustave Eiffel, bridge designers like John Roebling, and electrical engineers like George Westinghouse. It culminated, perhaps, with the moon landings, which made Wernher von Braun a household name. But by then engineers were fading from the public mind.

The era of the heroic engineer was the era of heroic infrastructure. In 50 years, the time it took to travel from New York to Philadelphia went from 2 days to 2 hours; the time it took information to travel that same distance went from 2 days to less than a second. *The New York Times* dedicated an entire section to the opening of Grand Central Terminal. Children played with erector sets and electrical kits. Magazines like *Popular Mechanics* featured updates on the latest steamships, bridges, and power plants. Giant dams and rural electrification were the emblems of recovery from the Great Depression. People flocked to highway dioramas at the 1939 World's Fair.

Along with the interest in technology came the veneration of engineers, the men who harnessed all that power. The progressive movement of the 1890s through the 1920s often tried to take policy power from corrupt politicians and grant it to technical experts. Engineers were trusted, as doctors still are, as experts who dealt in hard facts.

Infrastructure from the heroic era still reflects a deep sense of pride. The architectural details of power plants and substations were as considered as those of banks. The quality of construction reflects that pride, too: it is amazing how many bridges from the 1920s or even the 1880s still do their job while similar structures from the 1970s are already crumbling.

We continue building massive, world-changing infrastructure. The fiber optic cables that were tunneled through the country in the 1990s made YouTube possible. Massive docks in Hong Kong and Los Angeles, equipped with cranes the size of skyscrapers and operated by a single man, move cheap consumer goods to our homes.

But, aside from those who follow niche cable channels and specialist web sites about these projects, we don't seem to care. The "Technology" section of the paper covers new cell phones and antivirus tips.

THE *heroic* ENGINEER

by Christof Spieler



Isambard Kingdom Brunel, 1857.

Highways, airplanes, and railroads get attention mainly for their failures. When technology is featured in movies, it's often technology run amuck. More students are studying business, and fewer engineering.

Perhaps we have become jaded to constant change. We are surely ambivalent: we know from Love Canal, global warming, and numerous other examples that technology can harm the world just as it can improve it. We don't trust technocrats anymore: highway engineers destroyed neighborhoods and the "best and brightest" led us into Vietnam. We've lost our personal connection. Once nearly everyone knew someone who worked for a railroad, a factory, or the power company; today, we're a nation of office and retail workers.

It's also no coincidence that infrastructure is doing its best to hide from us. Industry has moved from city centers to vast out-

of-the-way tracts. Post-9/11 restrictions have closed off much of what was once visible. In the minds of those who operate our infrastructure, the public is a nuisance, perhaps even a danger. At best, infrastructure is utilitarian; at worst, it is disguised as in the case of cell phone towers in the guise of church steeples.

Engineers, too, do their best to stay anonymous. Technology has gotten so complex that there is no one designer: products and infrastructure are created by massive teams that integrate hundreds of technologies and components. Of course, that's true for nearly everything in our world, but engineering education and culture values modesty.

There are still heroes today, of course. And some of them even deal with infrastructure. But they're likely to be financial masterminds, not engineers. Enron's pipelines and power plants never got much attention, but the profits they claimed to make did. Had anyone built a statue for Enron, it would have been of Ken Lay, the financier. Likewise, the biggest story in highways in the past decade was toll road privatization. The Trans-Texas Corridor represented ordinary engineering, but it was heroic finance. The stimulus bill seemed to follow the pattern: talk of smart grids and high-speed rail fairly quickly gave way to news of negotiations and political deals over dollar amounts. We live in a cynical time.

Perhaps it is a testament to the quality of our infrastructure that we do not pay attention; electricity comes on demand, water is clean, and data instantly makes its way to our computers. But inattention comes at a cost. What we ignore can easily come around to harm us: the toll road through our neighborhood, the chemicals in the air, the rising oceans. We are starting to pay attention again. We talk about the origins of our food, about recycling our waste, and about reducing our carbon footprints. The pipes in our ground, the tracks and docks linking us to the world, and the plants that purify our water and filter our waste deserve the same attention. Whether we pay attention or not, engineers are shaping every moment of our lives. If we want to make our world better, we ought to pay attention. 

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