# THOMAS PARKE HUGHES

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THOMAS PARKE HUGHES died in Charlottesville, Virginia, on 3 February 2014 at age 90. He had been ill with Alzheimer's disease since 2009. Tom, as he was known to his friends and colleagues, was America's leading historian of technology and a founder of the discipline. He is fondly remembered by many scholars in numerous fields.

Tom was a unique type of scholar. He was a gracious, meticulous Southern gentleman who always made you feel comfortable and always made you feel that he had time for you—whoever you were. You always left his presence feeling better about yourself. He had an encylopaedic knowledge of the history of technology, which he would demonstrate at the drop of a hat, not to show off but to make a telling point about how technology actually developed. He studied great American inventors, such as Elmer Sperry and Thomas Edison, but was a debunker of the myth of the genius of individuals, arguing that technology formed a "seamless web" (to use one of his most beautiful metaphors) with economics, society, and politics. He was best known for studying large scale technological systems. He also had a passion for and vast knowledge of Art and Architecture, which he shared with his wife, Agatha (who died in 1997). He delighted in his house in Philadelphia, which he purchased in 1973 when he became a Professor at the University of Pennsylvania. It was known as "Mother's House," designed by the notable American architect Robert Venturi for his mother, Vanna. I guess for many people, it was simply "Tom and Agatha's house"—he and Agatha hosted numerous dinner parties there for family, friends, colleagues, and graduate students.

I first met Tom in 1984 when he was already the holder of a prestigious endowed chair, the Andrew Mellon Chair, in the Department of History and Sociology of Science at the University of Pennsylvania. By that point in his career, Tom seemed to effortlessly embrace interdisciplinary and cosmopolitan scholarship, forming friendships wherever he went. It is a testimony to his interdisciplinary legacy that one of his best known works, which Wiebe Bijker and I had the pleasure of editing with him, *The Social Construction of Technological Systems*,[1] has become a classic in both history of technology and sociology of technology. For many years, he was the Torsten Althin Visiting Professor at the Royal Institute of Technology in Stockholm, enabling him to develop the field of history of technology in Sweden.[2] Again, personal friendships, such as between Tom and Arne Kaijser and Jane

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1    W. Bijker, T. Hughes, and T. Pinch (eds.), *The Social Construction of Technological Systems* (Cambridge, Mass.: MIT Press, 2012; anniversary edition).

2    Arne Kaijser, "Tom Hughes—International Scholar," *Technology and Culture 55* (2014): 953–7.

Summerton, helped cement institutional ties. He had a long and productive association with research institutes in Germany and with colleagues such as Renate Mayntz and Bernward Joerges. He was frequently seen holding meetings in one Berlin café or another. In retirement from the University of Pennsylvania, he accepted a distinguished visiting professorship at MIT, where yet another professional/personal friendship with Roz Williams flourished.[3]

Apart from his intellectual achievements, Tom is also remembered as a generous and firm mentor to his many graduate students. Sometimes scholars have to bring their grad students bad news—that their work isn't yet up to snuff. In these days of political correctness and high esteem for everyone, this isn't always easy. According to John M. Staudenmaier,[4] a former grad student of Tom who became editor of the leading journal for the history of technology (*Technology and Culture*) and who gave Tom's funeral homily, Tom (in conversation with Agatha) agonized for days over how to break the news to Staudenmaier that the first draft of his thesis was a mess. Several of these former graduate students, including Bernie Carlson, Gabrielle Hecht, and Arne Kaijser, have spoken movingly of the endearing influence of Tom on their own lives and scholarship.[5] Tom was no saint, but when he was wrong on an intellectual issue, he would always acknowledge it and graciously moved on. He also could have a twinkle in his eyes. After Agatha drove Tom safely off the Nimitz Freeway in Oakland shortly before it collapsed during the 1989 San Francisco Earthquake, I asked him what went through his mind. Tom told me in a deadpan voice that he supposed a large scale technological system was collapsing.

Like many pioneering and generous scholars who did things their own way, Tom faced adversity in his early life and career. Here I draw on Bernie Carlson's memoir of Tom's early life.[6] He was born in Richmond, Virginia, and grew up during the Depression. His father, Hunter Russell Hughes, Sr., ran a family lumber business. They moved to Charlottesville, and Hughes Sr. took on the local Ford dealership. Economies crash, as do cars, and a car dealership at the time of the Great Depression was a car wreck waiting to happen. And it did happen. The family moved back

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3   Roz Williams, "Tom Hughes: Remembering a Non-Lifer, A tribute by Rosalind Williams," accessed     at     https://drive.google.com/file/d/0B2N9SDKEO5bWeWNrOWY2RzJueEk/view?pref=2&pli=1

4   John Staudenmaier, "Notes for Tom Hughes Funeral Homily, University of Virginia Chapel, April 4, 2014," *Technology and Culture Volume* 55, no. 4 (October 2014): 970–2.

5   W. Bernard Carlson, "From Order to Complexity: Thoughts on the Intellectual Journey of Thomas Parke Hughes," *Technology and Culture* 55 (2014): 945–52; Gabrielle Hecht, "On the Importance of the Visual . . . and Mentoring," *Technology and Culture* 55 (2014): 964–9; Arne Kaijser, "Tom Hughes—International Scholar," *Technology and Culture* 55 (2014): 953–7.

6   Bernie Carlson op cit., note 5.

to Richmond, and Tom experienced firsthand the economic uncertainties of the times. Everyone in the family was expected to contribute, and Tom became a delivery boy for a local pharmacy. This job had an unexpected advantage, as one Asian professor he delivered to possessed an excellent art collection that Tom was invited to peruse. Thus began his lifelong passion for art and architecture.

Tom studied engineering at the University of Virginia, but before completing his degree, he was called to active duty as an officer in the Navy and served as commander of a supply vessel in the Pacific during World War II. He eventually graduated with a degree in mechanical engineering in 1947. He then briefly sold roofing materials in Raleigh, North Carolina. Raleigh was an auspicious place for Tom because it was there he met the great love of his life, Agatha Chipley, whom he married in 1948. Tom and Agatha were inseparable. They were so close in their shared intellectual endeavors that often when I met Tom in Europe in the 1980s and 1990s, Agatha would be there as well. I would even receive emails from Tom signed by Agatha! With her detailed knowledge of the arts and her passion for learning, she was the perfect companion for Tom, and they went on to edit two books together.[7]

It was Agatha and her commitment to a life of the mind who inspired Tom to return to graduate school at the University of Virginia, where he studied modern European history. Tom was partly supported by the GI Bill but times were still tough, and while Agatha worked at the University Hospital as a nurse, Tom ran a business selling sandwiches to students. His links with the engineering school were not forgotten, however, as he lectured to the Engineering English Division at the University of Virginia. Tom completed his Ph.D. in 1953 and taught at Sweet Briar College and Washington and Lee College, where he eventually gained tenure.

But Tom was after something more—he had intellectual ambitions to bring together his new found love of history with his old love of engineering. And this meant writing in a new way about technology. It meant treating machines as if they too had a history, which might vary from place to place and time to time. It meant embedding machines back into the culture and society from which they had emerged—something that most engineers had forgotten. Tom hit on the perfect technology to write about in this new way, something so untrendy that in hindsight it is funny: the humble power grid. According to Bernie Carlson, Tom had been influenced in this choice by a charismatic University of Virginia professor, Frederick T. Morse,

7    T. P. Hughes, and A. C. Hughes (eds.), *Lewis Mumford: Public Intellectual* (New York and Oxford: Oxford University Press, 1990); and T. P. Hughes, and A. C. Hughes (eds.), *Systems, Experts and Computers* (Cambridge, Mass.: MIT Press, 2000).

who wrote the definitive book at the time on how to plan and build power-generating systems.[8] Morse impressed Tom because he showed awareness of the social, political, and economic context within which power plants must perform. Electrification had changed society, everyone knew that. But how society itself shapes electrification became Tom's project. And it was the study of electrical power networks that eventually led to Tom's magnum opus, *Networks of Power: Electrification in Western Society, 1880–1930*, published by Johns Hopkins University Press in 1984.[9] This study, which won the Dexter prize of the Society of History of Technology, was a comparison of the development of power grids in the United States, Britain, and Germany. Tom showed how local politics affected the shape of the grid in different ways. For instance, London, with its traditions of devolved political power via local authorities, built a grid with many substations, whereas Berlin, where political power was centralized, was dominated by big power stations.

To support his research on European power plants, Tom won a Fulbright fellowship to study at the Deutches Museum in Munich. But his time in Europe was marred by tragedy. He and Agatha were raising a young family of three children (Lucian, Agatha H., and Tommy) when the youngest, Tommy Jr., contracted leukemia and died a year later at age 6. Tom and Agatha had decided to stay on in Europe with no fellowship support, as Munich then had the best medical care for leukemia. Tommy Jr., we learn from Carlson, died in his father's arms. His last words to Tom were that he had found the secret of life: "The secret was being brave."[10]

Tom was brave. He eventually quit his job at Washington and Lee to become an assistant professor at MIT. But it was still not smooth sailing when he failed to get tenure at MIT. Alfred Chandler, the great business historian, had, however, heard that the family of Elmer Sperry wanted to commission a biography and arranged for Tom to take a 3-year position at Johns Hopkins, which was followed by a stint at Southern Methodist University. The book on Sperry was published in 1971 and won many plaudits, including a Dexter Prize from the Society of History of Technology. [11] It was on the strengths of this book that Tom was hired by Arnold Thackray at the University of Pennsylvania to help build the newly established History and Sociology of Science department.

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8   F. T. Morse, *Power Plant Engineering and Design: A Text for Engineers and Students of Engineering Covering the Theory and Practice of Stationary Electric Generating Plants* (New York: D. Van Nostrand Company, Inc., 1932).

9   T. P. Hughes, *Networks of Power* (Baltimore, MD: Johns Hopkins University Press, 1984).

10   Bernie Carlson op cit., note 5.

11   T. P. Hughes, *Elmer Ambrose Sperry: Inventor and Engineer* (Baltimore, MD: Johns Hopkins University Press, 1971).

It was at Penn that Tom finally found the space and time to write his big book on electrification, *Networks of Power*. The book appeared just at the time when a whole new intellectual approach toward understanding science and technology, known as social construction, was developed in Europe by scholars such as Donald MacKenzie, Bruno Latour, Steve Woolgar, Harry Collins, Michael Callon, Wiebe Bijker, John Law, and myself. And, of course, Tom was also a frequent visitor to Europe, so his work was soon noticed. We (the Europeans) met Tom at a conference in The Netherlands, and this meeting led to the *Social Construction of Technological Systems* volume already mentioned. Tom got social construction, linking it, in his own inimitable style, to his work on large scale technological systems. His essay in our collection is his most cited paper and contains his mature thinking about technologies as systems.[12] He introduces the important terms *reverse salients*, *critical problems*, *technological momentum*, and *technological style*.

Tom went on to write two books giving a broader canvas to his ideas. *American Genesis* appeared in 1990 and was shortlisted for a Pulitzer Prize in history, followed by *Rescuing Prometheus* in 1998.[13] Tom never found the general audience his work deserved. He refused to dumb down his ideas and never took the easy route of making technology anything less than what it is—one of the most complex and complicated aspects of human life. By the time he wrote *Human-Built World* in 2004, Tom's position on technological systems was shifting.[14] He argued for democratically sensitive, environmentally conscious systems. Tom visited Cornell in 2000, and I recall him lecturing to my class of young internet-savvy undergraduates—opening their eyes to the possibilities that the future of technology lay in more than just another startup.

Tom Hughes deservedly won many awards throughout his distinguished career. Apart from the two Dexter book prizes already mentioned, he won the Leonardo da Vinci Medal from the Society for the History of Technology—its highest award. He became a Fellow of the American Academy of Arts and Sciences in 1982 and a Fellow of the Royal Swedish Academy of Engineers in 1987; he was elected to the U.S. National Academy of Engineering in 2003 and the American Philosophical Society in 2003. He also received Honorary Degrees from the Royal Institute of Technology in Stockholm and Northwestern University.

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12  T. P Hughes, "The Evolution of Large Technological Systems," in W. E. Bijker, T. P. Hughes, and T. Pinch (eds.), *The Social Construction of Technological Systems* (Cambridge, Mass.: MIT Press, 2012): 45–76.

13  T. P. Hughes, *American Genesis* (New York: Penguin, 1990); T. P. Hughes, *Rescuing Prometheus* (New York: Pantheon, 1998).

14  T. P. Hughes, *Human-Built World* (Chicago: University of Chicago Press, 2004).

Tom Hughes saw his job as opening our eyes to the messy complicated technological systems and seamless webs that allow our human world to work. He was a true innovator, helping to define a new field and producing one of its most sophisticated approaches. His remarkable career and legacy lives on through the many people touched by his way of thinking, his writings, and his personal graciousness.

Elected 2003

TREVOR PINCH
Goldwin Smith Professor of Science and Technology Studies
Cornell University