Henry Petroski: Bridging the Two Cultures

Amos Joseph St. Germain
Wentworth Institute of Technology

The year 2009 marked the 50th anniversary of C. P Snow' "Two Cultures " address at Cambridge University. The premise of his Rede Lecture is fairly well known: Scientists and engineers think one way and scholars in the humanities think another and not only will the twain not meet, they don't want to. They might as well be on separate planets. (www. Telegraph.co.uk. May, 2009) Snow's address triggered a thunderous defensive response from F. R. Leavis one of Britain's old lions in the humanities.

Well many people think things have gotten better since then. The year 1977 saw the beginning of the INTERFACE Conference movement at Southern technical Institute in Georgia which was to last some twenty years. There is the Society for the History of Technology (SHOT), which publishes TECHNOLOGY and CULTURE and holds an annual conference. 1978 saw the birth of the still extant Humanities and Technology Association. So thing are better, no? Well maybe not so much.

Consider what Derek Bok past president of Harvard has recently said in his jeremiad, OUR UNDERACHIEVING COLLEGES (2006.) Bok sadly notes that 60% of student in American undergraduate education are majoring in "vocational" subjects not liberal arts and they see getting a job as the primary reason for going to college (260.) And if you really want to make sure that your young person is deficient in writing, speaking, cultural awareness and foreign languages by all means have that young person major in engineering perhaps the most structured of college majors (298-300.) So it goes.

However the good fight continues and in engineering education scholarship and culture scholarship there are bright lights to be sure. In American Studies there is David Nye who is in the myth, symbol, allegory, metaphor tradition of Henry Nash smith and Leo Marx. His recent work includes a study of technology and history in the nineteenth century, AMERICA AS SECOND CREATION: TECHNOLOGY AND NARRATIONS OF NEW BEGINNINGS (2003.) And of course there is the work of Samuel Florman who hold degrees in civil engineering and English. His "In Praise of Technology," (HARPERS. November 1975, 53-72) remains the best exposition of, the common complaints against modern technology.

My focus here today is the work of the prolific Henry Petroski. Like Florman Petroski is a man of more than one discipline. He is professor of both civil engineering and history at Duke University. He is the author of fourteen books all of which are still in print and his writing career covers more than thirty years. He has been a regular essayist for AMERICAN SCIENTIST magazine and a frequent contributor to ASEE's PRISM magazine.

In 1977 (BEYOND ENGINEERING) Petroski engagingly told us that a journey on a train is an exhibit of the history of technology: bricks, stone, wood, steel- the journey, the product, the result. In 1997 (REMAKING THE WORLD) he was writing about building the Panama Canal and about Charles Steinmetz and Alfred Einstein and the importance of teaching students how to make guesstimates. More recently, PUSHING THE LIMITS: NEW ADVENTURES IN ENGINEERRING(2004) we find him writing about bridges, photography (Alfred Stieglitz) and modern art (Georgia O'Keefe.) In other words, Petroski writes about science and engineering in the academic sense and about a myriad of topics that are technology in everyday life.

Allow me to highlight for you some of Petroski's most recent efforts. Writing in a recent number (December 2009) of ASEE's PRISM (29) Petroski praises courses in Art Appreciation. They are good he argues because they teach students how art is produced, the materials used and the techniques employed. Maybe we should do the same thing in engineering education. Maybe we should have engineering appreciation courses. Student. Particularly early on don't get a clear idea of where engineering fit in to the culture. Engineering like art is an ongoing creative process, "engineering is a grand continuing enterprise having made civilization civilized and being essential to its future…."

Or consider his recent Foreword (7-9) to Bethanne Patrick and John Thompson's book (2009), THE UNCOMMON HISTORY OF COMMON THINGS. We are regaled with the history of the thermos bottle, the hot dog, aluminum foil, the safety pin, the automatic dishwasher and several hundred object and practices. Theirs is the kind of democratic and pervasive explication of technology that Petroski enjoys and defends, "Everything was created, invented, and developed for a purpose; everything is the result of a kind of everyday engineering. Like modern engineers who are called upon to solve problems that arise in the course of living in a technological society, so the oldest and most enduring things that everyday people devised in times past came about in the course of organizing civilization itself." (9)

Petroski's most recent book (2010) is THE ESSENTIAL ENGINEER. It is classic Petroski. He reports that carbon nanotubes used in structures are shaped like microscopic needles so the use of carbon nanotubes made lead to a condition not unlike the problems encountered with the use of asbestos (7.) In the same vein Petroski reports that nanotubes of silver used in textiles can leach into the environment (7.) Again we find his broad view of engineering," A scientist studies what is; an engineer creates what never was; science is the study of what is; engineering is the creation of what never was (20.)

We erroneously assume Petroski argues Plato's theory that ideas are superior and prerequisite to things. Petroski holds with the poet William Carlos Williams," no ideas but in things." (20) Science need not always precede engineering,

"…the engineers can go a long way in creating what never was without fully formed science of the thing." (30) Most importantly, engineering is the human itch. Foe how many thousands of years did man stand on the ground and watch the birds soaring above him and wish that he could fly? And man often attempted to do so often with catastrophic results bit the urge remained. Before there was the Bernoulli effect there was the dream.

Sometimes the technology is ahead of the science. Petroski tells us about Isambard Kingdom Brunel who built the steamships, Great Western and Great Eastern, which proved that steamships could carry enough coal to make long ocean voyages despite scientific calculations that said this, was impossible (48-49.)
Similarly the intercontinental ballistic missile came into being and was deployed despite the view that the missile could not survive the heat generated by its movement through the atmosphere.

Also fascinating and important is Petroski"s agreement with engineering educator Hardy Cross ' idea that there are several models of how engineering and society fit together. One model is probably very familiar to us: Pure science, applied science and engineering. One moves allegedly from greater to lesser. But there is a second: economic theory, finance and engineering and most importantly for the two cultures argument a third: social relations, industrial relations and engineering.
Engineering problems are as closely united to social problems as they are to science (145.) Perhaps this is what we should be teaching students.

As always Petroski is all over the place in this book. My personal view though is that any man who can writ about Einstein, temptress Heddy Lamarr and ventriloquist-inventor Paul Winchell can't be all bad.

CONCLUSIONS

There are different kinds of intelligences as these authors show both in themselves and in their subject matter.

People like Petroski who write intelligently for the general reader are a treasure. You can be a good writer and a good engineer and having a sense of humor isn't bad either.

One kind of interest does not preclude an interest in something else.

Once you start approaching the history of technology the way Petroski does all sorts of things become technology: from breakfast cereal to nuclear accelerators. It is as novelist Henry James observed "In reality relationships end nowhere."

Looking at various models of the relationships between, science engineering and society is good for students and all of us.