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Technological literacy is crucial to public policy

Home News Tribune Online 01/10/06

HAYM BENAROYA

The dichotomy between the "good" and "bad" uses of science and engineering has been a part of the public discourse for a long time. The atom bomb especially invigorated such discussions with the most heated discussions occurring among those who actually performed the research and built the hardware. (These same people would agree, however, that working toward the national defense is a worthy and honorable profession.)

Scientists and engineers will often discuss the morality of certain inventions that have dual civilian benefits and military capabilities. The difficulties and the ironies of these discussions are twofold. The first is that most technology benefits civilians and the military. (In fact, the military is the largest single supporter of basic research — and the motivation for many of the most important civilian inventions.) The second is that too few engineers and scientists are in high-level public policy positions and therefore have little control over how "their" technology is used.

Why are so few technical types in policy positions? Generally, people who have scientific interests spend years to learn and therefore enjoy "doing science." They usually do not have an interest in public policy or elected office. This is understandable but regrettable for society since those in elected office tend to be lawyers with a very limited understanding of the workings of the society, except perhaps as it involves the law and personal opinion. Similarly, economists are heavily involved in governing, but again their expertise is generally not from the sciences, even though economists tend to be more mathematically trained than lawyers are.

The problem with this situation is that many decisions at the highest levels depend on an understanding of the science at some meaningful level. Examples of scientific issues involve stem-cell research, pharmaceutical/medical issues, bioengineering, nanotechnology, materials, space and aerospace, to name a few. The government deliberates and creates rules and laws on all these and many more issues that are fundamentally based on technology.

While it is possible to make reasonably good decisions without knowing the underlying science, better decisions require more understanding. For this reason, scientists and engineers need to get more involved in the larger issues beyond the technology or science of their work. It is imperative that we also inform and educate the populace on the key issues regarding our work. This does not have to be overly technical, but of sufficient depth to transfer the important larger issues, those that would be important to any person but in particular to decision makers.

Some scientists and engineers write books that help us understand scientific basics, or that explain how various engineering marvels were created. There are also numerous books on technology and its impacts on society. This series of articles in the Home News Tribune is also an effort to bring to light sometimes-obscure topics to the nontechnical but interested reader in terms that allow an understanding of the tradeoffs in any technology, where the positives shine but more importantly, where the negatives may be hidden from sight.

Therefore, the atomic level understanding of matter we have has led to both nuclear power (which in most parts of the world is very useful and supported) and nuclear weapons, which are of great worry especially when possessed by rogue nations. Another major example is the environment. All the technologies that pollute have some positive benefits to society. They provide us either with energy, manufacturing resources, or entertainment. The delicate balancing act of safeguarding the environment while reaping the benefits of a technology is important to all of us. The reality is that technology is going to help us do the balancing as well as solving the negative side effects.

The lines are generally blurred in this debate. Many times information that is misleading or wrong is published in order to push the debate and, ultimately, the decisions along a particular path. The public (including too many reporters) are easily misled. The government, with all its expert witnesses, can also be misled, since the issues are complex. The public needs to spend some time understanding the essential technical aspects of a problem. Our kids need to study math and science, more so today because of the ever-increasing complexity of society. For if we become less technologically literate, we will be led by the nose to places that will be very unpleasant and dangerous, to say the least.

Be Counted columnist Haym Benaroya is a professor of mechanical and aerospace engineering at Rutgers University and directs the Center for Structures in Extreme Environments. He is a resident of East Brunswick.