Changes and the Future

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"I was born in 1936. At that time there were no jet planes and commercial plane traffic was effectively non-existent, there were no computers, no space satellites, no microwave ovens, no electric typewriters, no Xerox machines, no tape recorders. There were no stereo music systems nor compact discs. There was no television in 1936. No space travel, no atomic bomb, no hydrogen bomb, no 'guided missiles,' as they were first called, no 'smart' bombs. There were no fluorescent lights, no washing machines nor dryers, no Cuisinarts, no VCRs. There was no Express Mail, no fax, no telephone touch-dialing, no birth-control pill. There were no credit cards, no synthetic fibers. There were no antibiotics, no artificial organs, no pesticides or herbicides. During my lifetime all this has changed," says author Jerry Mander.[1] I can relate to all this since I was also born in 1936.

A question one might ask is how do today's technological marvels compare with those of the past? Phillip Longman says one way to get a sense of the past is to watch any of the family sitcoms on *Nick at Nite*. He notes, "When Ozzie and Harriet made their television debut on October 3, 1952, they didn't have Internet access or a cell phone, but their living conditions were otherwise very close to those of today's middle-class families. They had indoor plumbing, electric lights, car, television, telephone, refrigerator, blender, vacuum cleaner and probably an automatic washer and dryer. If a time machine magically transported the Nelsons to a typical middle-class household in 2000, they would find most of the technologies of ordinary life improved and need only a second to realize we now use push buttons instead of rotary dials. They'd recognize the television even if, like most everyone else these days, they'd have trouble programming the VCR. The air conditioning and high-quality sound systems available in today's cars might please them, but they would have no trouble knowing how to fuel or drive one. Picking up the morning newspaper, they might be puzzled by references to AIDS and genetically-modified food but would understand references to nuclear power, plastics, antibiotics, jet airplanes, rockets, radar, lasers and even computers."[2]

Continuing this line of thought, David Bodanis reports, "Everyone in Silicon Valley believes that technology is being introduced faster than ever. But in their private lives, hardly anything has changed in years. The plane I flew in on, for example, was a Boeing 747. It's a great jet, but it was designed more than 30 years ago. There are more movies to watch on board than there used to be, but the basic idea - a metal tube attached to jet engines that burn modified petroleum, carrying a lot of people at around 600 mph - is much the same as it has been for all planes since then. When I got out of the plane, I used a credit card to rent a car. Well, credit cards are almost half a century old, and although the computer systems behind them are faster than they once were, people have been using this basic technology for decades. The rental car itself was a lot like a car from two decades ago: It got similar mileage, had a similar driving experience. The news of the day was about plans for the next launch of the space shuttle, which at first glance seems a mark of high-tech modernity. But the shuttle was designed in the 1970s, using a great deal of 1960s technology. Its design was locked in around the time Ford introduced the Pinto. It goes on and on. Oil rigs and nuclear missiles and microwave ovens and the New York Stock Exchange and international phone calls - all work more efficiently than in decades past, but they still feel much the same as they did many, many years ago."[3]

Yet instead of transporting Ozzie and Harriet from 1950 to 2000, suppose they were transported half a century in the opposite direction. In 1900 existence was extraordinarily arduous. Life expectancy at birth was only 47.3 years, compared with 68.3 years in 1950. Lack of refrigeration and poor sanitary conditions meant millions died from spoiled or tainted food, while epidemics of scarlet fever, yellow fever and smallpox offered constant reminders of life's fragility.

"Affluent households were illuminated with gaslights that were expensive to run and prone to explosion. Without electricity, there were no laundry machines, vacuum cleaners or other mechanical means to purge the household of dirt and germs. Only the super rich could afford a car and the vast majority of families did without indoor plumbing. Further, there would be no access to a telephone, or even a radio to provide entertainment."[2]

Ozzie and Harriet would also have noted that people looked different in 1900 than in 2000. American men, for example, were nearly three inches shorter in 1900 than in 2000 and also about 50 pounds lighter.[4]

Recent changes

Admittedly some things have changed in the past 20 years. Back then the world was entirely lacking cell phones, PDAs and e-mail. When folks had free time they had to talk among themselves. When the mother was at home, she couldn't download the documents she was expected to work on at the office.[3]

But is our progress for the better? Before cell phones, it was easy to mull over seemingly random ideas in our free time. Now even the smallest gaps of unstructured time are easily filled up, making fresh innovation harder than ever to start.[3]

Though automobiles now contain microchips and some can talk to you, in most parts of the country it actually takes longer to drive from point A to point B than it did 30 years ago, because of worsening congestion. Between 1992 and 2001, time spent in traffic jams increased by 650 percent in large and medium-sized urban areas.[5]

In 1938 the 20th Century Limited, pulled by a steam engine, sped from New York to Chicago in sixteen hours. Today, Amtrak's version of the train, drawn by a high-tech fuel-injected diesel-electric locomotive with computer diagnostics on board, takes five hours longer.[5]

The microcomputer industry has been with us for at least two decades. Paul De Raima observes, "We have poured staggering sums down its insatiable maw. It is time to face an unpleasant fact; the so-called microcomputer revolution has cost much more than it has returned. One problem is that microcomputers are vastly more complex than the tasks ordinarily asked of them. To write a report on a machine with a Pentium II processor, sixty-four megabytes of memory and an eight-gigabyte hard disk is like leasing the space shuttle to fly from New York to Boston to catch a Celtics game."[6]

The future

So what does the future hold? Predicting the future is very difficult as Stephen Jay Gould observes, "We humans may be the smartest objects that ever came down the pike of life's history on earth, but we remain outstandingly inept in certain issues, particularly when our emotional arrogance joins forces with our intellectual arrogance. Our inability to forecast the future lies foremost among these ineptitudes - not, in this case, as a limitation of our brains, but more as a principled consequence of the world's genuine complexity and indeterminism."[7] John Jennrich adds, "The best scientific panel available in 1900 would simply not have been able to plan for hundreds of millions of automobiles and trucks, ubiquitous electric lighting in tens of millions of houses and office buildings, fuel for thousands of jet planes and tens of millions of refrigerators, air conditioners, computers, telephones, radios, telephones and the like. Virtually none of the devices on this nearly endless list had even been invented by 1900. Given the increasing rate of technological innovation, we undoubtedly have even less chance of foreseeing the future than people in 1900."[8]

Another view is that of Lee Silver who says, "Although we cannot predict what advanced technology will look like in a few centuries, we can use the simple algebra of compounding percentages (analogous to the economic principle of future discounting) to estimate how different the future human world will be in technological terms from the way it is today. For example, if we start with the assumption that significant innovation and invention will be responsible for a 1 percent yearly technology replacement rate, then next year's technology will be 99 percent similar and the following year's technology will be 98 percent similar to what we have today. But if the same yearly replacement rate of 1 percent continues for the next 470 years, 99 percent of the technology available in 2475 would be unrecognizable to people alive today. Move forward to the end of the millennium, and the knowledge and power we have today would represent just 0.005 percent–essentially zero–of the technologies that define that future human society."[9]

Although Silver's view 500 years in the future sounds somewhat drastic, looking back 500 years makes one pause and reflect. Here's some information from the Internet about life in the 1500s: (Remember this is from the Internet, so I'm not sure of the authenticity, but it's interesting nevertheless.)

Most people got married in June because they took their yearly bath in May, and still smelled pretty good by June. However, they were starting to smell, so brides carried a bouquet of flowers to hide the body odor. Hence the custom today of carrying a bouquet when getting married.

Baths consisted of a big tub filled with hot water. The man of the house had the privilege of the nice clean water, then all the other sons and men, then the women and finally the children. Last of all the babies. By then the water was so dirty you could actually lose someone in it. Hence the saying, "Don't throw the baby out with the bath water."

Houses had thatched roofs-thick straw-piled high, with no wood underneath. It was the only place for animals to get warm, so all the cats and other small animals (mice, bugs, etc.,) lived in the roof. When it rained it became slippery and sometimes the animals would slip and fall off the roof. Hence the saying: "It's raining cats and dogs." *P&SF*

References

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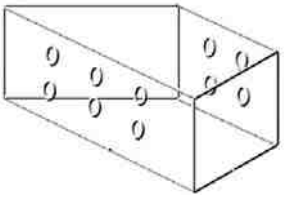
9. Lee M. Silver, *Challenging Nature*, Harper Collins, New York, NY, 2006; p. 319.

Test Your Plating I.Q. #434

By Dr. James H. Lindsay

Curious questions



1. Why does the Hull cell illustration at the right have holes in its walls?
   Hint: It is NOT used as a mold cavity for cheesehead hats for the Green Bay Packers.
2. What is TDS? What does it refer to?
3. Eddy current measurements are used to measure plate thickness. What other measurement/testing applications employ eddy currents?
4. Eddy currents are also known as Foucalt currents. Why? What is the relationship between Foucalt and Faraday currents?
5. Bus bars are rigid, electrically-conducting sections used to carry current to the cathode bars. What is used to carry current to the anode bars?

Answers on page 39.