

COMMENT

# The past is a foreign country

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'When I was your age,' my father was fond of telling me, 'I used to walk 5 miles through a foot of snow just to go to school.' I was impressed for a while, until I noticed that, as he got older, the distance got longer and the snow got deeper. Eventually, he claimed to have walked 20 miles through 6 feet of snow. I became even more suspicious when I found out from my grandmother that they had lived three blocks from school.

In an age of school buses and car-pooling parents, such stories, whether believable or not, conjure up visions of a world almost beyond the imaginations of today's children. I was reminded of that today by an email from my friend and Brandeis colleague Tom Pochapsky, who directed my attention to a fascinating article on the website of Beloit College (<http://www.beloit.edu/mindset/2014.php>). Each August since 1998, Beloit College has released the Beloit College Mindset List, which provides a look at the cultural background of the students entering college that fall. The creation of Beloit's Keefer Professor of the Humanities Tom McBride and former Public Affairs Director Ron Nief, it was originally created as a reminder to the Beloit faculty to be aware of dated references. As the website notes, 'it quickly became a catalog of the rapidly changing worldview of each new generation.'

So what's the worldview of the class of 2014? According to the latest list, here are a few of the things these 18-year-olds, born in 1992, have experienced - and not experienced:

- Few in the class know how to write in cursive.
- They find that email is just too slow, and they seldom if ever use snail mail. They text. Oh, God, do they text.
- To them, Clint Eastwood is better known as a sensitive film director than as vigilante cop Dirty Harry.
- For them, Korean cars have always been a staple on American highways.
- They've never recognized that pointing to their wrists was a request for the time of day.

- In their world, Czechoslovakia has never existed. There was no Berlin Wall, the Iron Curtain is a meaningless phrase, and Russia has never had a Communist government.
- There has never been a world without AIDS.
- The Beatles and the Rolling Stones are classical music.
- Toothpaste tubes have always stood up on their caps.
- There have always been women priests in the Anglican Church.
- Having hundreds of cable channels but nothing good to watch has always been the norm.
- The US public has never approved of the job the US Congress is doing.
- Most of them have never seen a long-playing record, or even a tape drive. If they have ever seen a typewriter, it was in a museum, possibly alongside a dial telephone.
- They have never lived in a world without personal computers, the Internet, CD-ROMs or laser printers.

There are, of course, many things they have experienced that we also experienced at the same age. Among these are automobiles, jet airplanes, color television sets, and the Chicago Cubs not having won the World Series. Another commonality has been the enduring hostility between the English and the French.

But they couldn't imagine life without PopTarts, juice boxes, and movies you can have on your home TV, and they have no idea how we could have survived in a world that required carbon paper.

All of which got me wondering: what would the *scientific* worldview be like for someone, let's say, just starting graduate school today (and therefore about 22 years of age)? Born in 1988, how would their *scientific* lives differ from the lives of the generations preceding them (including mine, which is the only one I really care about)? It makes for some interesting speculation:

- For today's budding biologists, DNA fingerprinting would have always existed. Actual fingerprinting would have been a recent invention, used primarily to secure laptop computers.
- Protein crystal structure determination would for them never be anything but a routine tool.
- Molecular biology would never have been a discipline in its own right. Instead, it would always have been a set of techniques, introduced to students in better high schools.

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- They cannot imagine a world without kits to make experiments virtually automatic.
  - Since the first free-living organism had its genome sequenced when they were 7 years old, they have grown up in the age of genomics. They have had access to the complete sequence of the human genome since they were in middle school.
  - They have never attended a lecture given with slides from a carousel projector, and they may not have ever seen one given from overhead transparencies either. PowerPoint has been in use for virtually their entire lives.
  - In their lifetime, no one has ever pipetted anything by mouth.
  - DNA sequencing, peptide synthesis, chemical analysis, and gene synthesis have always been farmed out to specialty companies rather than done in one's own lab.
  - They have almost certainly never seen anyone blow glass. In fact, many of them may not know that test tubes were ever made of anything but plastic.
  - They have always had the option of going into the biotechnology industry.
  - The term 'enzyme' has always referred to both protein and RNA.
  - Evolution has always been under attack, and science and religion have largely been seen as incompatible.
  - There have always been 'big science' projects in biology.
  - Chemistry has always been a declining field in terms of student interest, and physics has always been the province of a small number of practitioners.
  - Believe it or not, they have never known a world without cDNA microarrays.
  - For them, 'Xerox' is a verb, Polaroid makes LCD TVs, and every piece of equipment is computer-controlled.
  - They have never requested a reprint. They probably don't know what one is.
  - They believe that no science was done before 2000. Any science not indexed on PubMed was not done either, even if it was done yesterday.
  - They cannot imagine that there once was only a single *Cell* journal, and just one *Nature* as well.
- I'm sure you could think of lots more. I know I could, but we had 10 feet of snow last night, and that 50-mile walk to school is going to take me a while.

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