That Was Then, This Is Now

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"My great-grandmother sure saw a lot of changes in this old world before she passed on." This was a story that my ag teacher was telling me as we discussed topics for the upcoming speech season. He went on to say, "Grandma told of how she watched her parents guard their home with rifles from outlaws in pre-statehood days. She would later watch horses be replaced with the mechanical horse power of automobiles and tractors. She saw cattle trails turn into super highways. She was able to read her Bible at night with the flip of a switch and not the strike of a wooden match. She saw telegraphs replaced by the telephone and then cell phones. She saw man take flight, walk on the moon, and eventually the shuttle going into space and back with the ease of an airplane. She saw computers practically take over our lives in the areas of finance, record keeping, and global networking through the World Wide Web. Her tired old eyes saw what must have been amazing, life-changing events in her 98 years of life. Things that you and I take for granted today. Kyle, the obvious question is what will you see in your lifetime?"

As I pondered that question, I brought up Google on my high-speed Internet. I typed in the words "emerging technologies in agriculture" and clicked search. How has technology advanced the field of agriculture? What role are emerging technologies playing in an ever-changing world that we live in? How is technology keeping pace with the demands of today's world? What technological advancements will I see in my lifetime?

Grandma was so impressed when she was able to flip that switch on the wall to read her Bible instead of lighting the coal oil lamp. I can only imagine what she might think about how our whole world has come to revolve around the use of electricity. There have been two standard methods of electrical power production, that being hydro-electric plants and coal-fired electric plants, until now. One of the newer and more promising technologies in this field involves using

our unlimited supply of wind to produce electricity. Last summer I had the opportunity to participate in a wind energy camp in Weatherford. I learned the mechanics of wind turbines and the processes used to generate electricity. I also learned of an amazing opportunity for Oklahoma agriculturists to cash in on this "green" opportunity. I learned that if Oklahoma farmers and ranchers don't have the capital to invest in wind-powered turbines, they can lease their land to wind farm developers and still use their land for farming and ranching.

I'd venture to guess that when Grandma watched the Space Race and the success of the shuttle missions, she never would have believed that it would allow today's farmers to benefit from Space Age technology. We all know about Global Positioning Systems and how you can use a Garmin or a Tom Tom to find maps and routes to just about any destination on the planet. However, did you know that a farmer can set his tractor up with a computer and a GPS to fertilize his field with different nutrients at the needed rates all over the field without ever slowing down? This is known as precision agriculture. Based on what are called "site-specific" methods, precision agriculture involves studying and managing variations within fields that can affect crop yield. It revolves around the idea that treating a large region as a uniform area is essentially wasteful and uses an excess of costly resources in the form of fertilizers, pesticides, and herbicides. Any area as large as a football field can contain wide spatial variations in soil types, nutrient availability, and other important factors; not taking these variations into account can result in a loss of productivity. While farm input costs continue to rise, individual farmers cannot do anything to raise the price of their crops due to the nature of the commodities market. Precision agriculture is a method of farm management that allows the farmer to produce more efficiently, thereby realizing gains through the economical use of resources.

When Grandma saw those first gas powered vehicles become reality, I wonder if she would have believed that they could one day be powered by something as sophisticated as hydrogen. Hydrogen, taken from water, is being used to power things from cars to space shuttles. These hydrogen powered cars are not only the future, they are here. There are already many hydrogen fuel cell and H_2ICE vehicles on the roads in places such as Germany, Japan, Norway, and even California. bringing this so-called "hydrogen highway" to the rest of America could help us break away from OPEC controlling the prices that we pay at the pumps and bring us one step closer to being self-sufficient in our oil needs.

As Grandma was growing up I doubt she would have even considered that the leftovers from her family's Thanksgiving meal or the waste from their livestock could one day power a car. Changing World Technologies is doing just that. Their process successfully converts everything from old tires to turkey remains into renewable fuel. The waste material is shredded and mixed with water. Then it is heated and pressurized so that the mixture can be separated into oil, activated carbon, gases, and water. Lastly, the oil is converted into gasoline and diesel fuel. This process is known as thermal depolymerization. Imagine if this were implemented on a large scale to recycle all 6 billion tons of agricultural waste in the U.S. Theoretically, with thermal depolymerization this waste could be converted into 4 billion barrels of oil, which also happens to be the amount of oil the U.S. imports each year.

Unfortunately not all of the changes over the course of Grandma's life were good changes. The ever-growing connectivity around the globe and new technologies are making an old threat even more dangerous. A terrorist attack on American agriculture would be devastating. For instance, if someone were able to produce just 10 grams of botulinum, the same toxin used in

Botox, and poured it into a milk tanker, five hundred thousand people would be poisoned and about half of them would die.

Fortunately, technology has also provided us with the ultimate defense against any terrorist attacks that could potentially wipe out an entire species of crops. The Svalbard Global Seed Vault in Norway which is protected by four locked doors, -18 degrees Celsius, and polar bears was created to restore a crop should it become extinct due to natural or man-made causes. It stores a half-million seed varieties and has seeds from different regions all around the globe.

Considering not only wind turbines, GPS, hydrogen power, thermal depolymerization, and weapons of mass destruction, I also wonder what Grandma would have thought about Dolly the sheep, the first cloned animal. I wonder what she would have thought when scientists started mixing the DNA of different organisms, or when we watched the news to see a human having a pig's liver replace his own to buy time to find a donor. Through xenotransplantation this is possible. I wonder if she would have believed that through genetically modified plants we could possibly have the solution to world hunger, or that the global warming problem has become so overwhelming that we are toying with the concept of carbon taxation. Yes, this grandmother saw unbelievable changes in her lifetime, changes that you and I may take for granted. The obvious question before us today is, what kind of changes can we expect to see in our lifetime?

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