MONDAY MOTIVATOR

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TECHNOLOGY PART TWO OF THREE

Welcome to our 48th edition of The Monday Motivator, and our first double issue. In this issue we're going to explore the second of three editions devoted to TECHNOLOGY; specifically what it means to business. In part two we'll peek at what happened during the industrial age (sometimes referred to as the "industrial revolution") from about 1800 to 2015. In part three we'll see what lies in store for the human race taking us to the year 2100.

The Industrial Revolution, which took place from the 18th to 21st centuries, was a period during which predominantly agrarian, rural societies in Europe and America became industrial and urban. Prior to the Industrial Revolution, which began in Britain in the late 1700s, manufacturing was often done in people's homes, using hand tools or basic machines. Industrialization marked a shift to powered, special-purpose machinery, factories and mass production. The iron and textile industries, along with the development of the steam engine, played central roles in the

Industrial Revolution, which also saw improved systems of transportation, communication and banking. While industrialization brought about an increased volume and variety of manufactured goods and an improved standard of living for some, it also resulted in often grim employment and living conditions for the poor and working classes.

On the left we see a painting from the 1800s era by William Bell Scott showing a typical coal fired plant where men toiled in unsafe and highly laborious conditions for very little pay. Britain is said to have given birth to what was then called the "industrial revolution" due to their deposits of coal and iron ore, needed for industrialization. Also Britain was a stable society that supported a market for factory made goods and a means of distribution of raw materials. Whole new businesses were created to accommodate this new source of goods. The more demand for such goods expanded, the more industrial factories were built and these ran on very large steam engines powered by burning coal.

In this modern age we take much of what's around us for granted. But at the turn of the century in 1800 business was about to explode along with all the goods that would be turned out by factories on a global scale. For example, it was in 1800 that the battery was invented. Four years later gas lights were invented. Five years later in 1809 the arc lamp was invented that aided in mining operations. By 1810 the more improved printing press was invented and so was the tin can – very much like the ones we use today.

Imagine the business that came from these developments. By 1814 George Stephenson creates the first steam powered locomotive. That single invention along with the tracks it ran on changed the world forever. Such systems of heavy transportation are still in use today although by the 1950s electric powered motors were driving the huge locomotives that pulled and pushed the world's goods in addition to people traveling across entire continents. In 1819 the soda fountain and the stethoscope are also invented. By 1824 Portland cement is invented and becomes a modern building material we still use to this day.

Then in 1825 the electromagnet is invented and this eventually leads to both generators and electric motors. In 1827 both matches and the microphone are invented. In 1829 the first typewriter is introduced. By 1830 sewing machines were invented and that alone created an industry that to this day supports entire nations around the world. By 1835 photography is introduced along with wrenches, propellers and mechanical calculators. Business was being created every step of the way to accommodate these amazing inventions. By 1840 blueprints are invented then the stapler then the first facsimile process. By 1846 the blessing of anesthesia is introduced. Up to 1855 all sewing machines were human powered. Then along came the electric motor to run such machines. In 1858 Jean Lenoir invents the first internal combustion engine and that invention is still propelling over 300 million vehicles in the USA alone as you read this.

By 1861 we see the introduction of the elevator, bicycle and lock. Imagine the businesses that were created around such innovations. Just to be in sales would have been a high level job in those days as it is today. Plastic was actually invented in 1862 but the ability to mold it did not come along until much later. Then one of the most important inventions of all time came along; the telephone in 1876. Also a miracle

machine called the "vacuum cleaner" was invented in this year and we're still using them today. By 1877 we saw the introductions of the phonograph and moving pictures. Think the record industry and movie studios of today to get an idea of the new business this created. By 1885 the world saw the first motorcar – created by Karl Benz and he named it after his daughter, Mercedes. The motorcycle was invented that same year.

The following year Coca-Cola was introduced to the word and in those days there really was a tad of cocaine in the mix. (The cocaine was removed from the recipe in 1929.)

Perhaps one of the most impactful innovations was the invention of the electric home refrigerator. The Chinese used to cut and store ice in 1000 BC. By 500 BC the Egyptians learned how to make ice in pots on cold nights then use the pots where they were needed. Then ice boxes came along. Wooden boxes lined with tin or zinc and insulated with various materials including cork, sawdust, and seaweed were used to hold blocks of ice and "refrigerate" food. A drip pan collected the melt water - and had to be emptied daily. As a boy in the 1950s I recall the ice man arriving with a huge 50 pound block of ice on his leather clad shoulder held in place with a giant tong arrangement. And I also recall

the day our house got our first electric refrigerator. The neighbors came over to marvel at this wonderful new invention. We had arrived!

By 1916 over two dozen different models of home refrigerators were available to those who could afford them. By 1922 models were available with two ice trays and nine cubic feet of storage. It cost $714 at a time when the average annual income was only $3,150. Over time the price was $240.

By the turn of the century to 1900 we saw the introduction of the escalator, diesel engines, zippers, movie projectors, and many other life changing technology advances.

The 1914 Model T touting car - the very first version build on Henry Ford's assembly line. It was powered by a 4 cylinder 20 HP gas engine with a two speed transmission. $550 each.
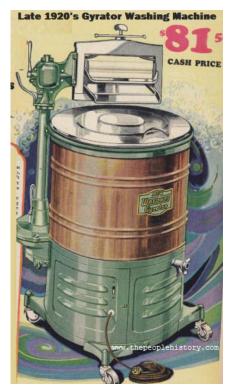
However for all the spectacle these innovations created none would compare to what was coming. First among the technology advances for the 20th century was the air conditioner in 1902.

By 1913 Henry Ford had built an auto assembly line and this allowed a factory to build a complete car in just 2 hours and 30 minutes. His model T was introduced in 1908 but took over 12 hours to build as they were done by hand with one team working on one car at a time. The cost reflected this time requirement so the business end of the technology of the assembly line was huge. Now everyone could afford a motor car as the price dropped dramatically. 15 million were produced between 1908 and 1927.

By 1928 penicillin was introduced. This alone was a huge innovation and one that changed medicine forever. The first ever digital computer was actually created in 1937. By 1955 the first microwave ovens came along. One of the most time and labor saving inventions was the electric powered washing machine. For a mere $81.50 one could have this super machine that did away with hand washing. Of course one still had to hang the wet clothes on a line outside to dry – if it was not raining that day.

By 1945 mankind had unleased the awesome power of the atom. Two now infamous bombs were invented and sadly, used against another nation as the best of all possible choices. Politics has never been the same. But this discovery also brought many good uses for controlled radiation. By 1950 the TV remote was invented. So were credit cards. In 1951 super glue came along as well as power steering and the first video tape recorder. By 1955 the first cardiac pacemaker was used. Music was everywhere thanks to radios that were also

everywhere. Invented by Guglielmo Marconi in 1894 the radio became smaller, cheaper and better by the 1950s, just in time for rock and roll! TV came along in the 1940s in a big way and this all added up to home entertainment that spawned huge new business opportunities. Management had a new meaning.

1953 saw the firs transistor radio created by Texas Instruments. The following year saw the invention of Teflon pans and the solar cell while a guy named Ray Crock started a little fast food business called McDonalds. In 1955 many new innovations came along including the first fiber optic cable. At this time computers were coming on the scene. The earliest electronic computers were not "personal" in any way: They were enormous and hugely expensive, and they required a team of engineers and other specialists to keep them running. One of the first and most famous of these, the Electronic Numerical Integrator Analyzer and Computer (ENIAC), was built at the University of Pennsylvania to do ballistics calculations for the U.S. military. ENIAC cost $500,000, weighed 30 tons and took up nearly 2,000 square feet of floor space. On the outside, ENIAC was covered in a tangle of cables, hundreds of blinking lights and nearly 6,000 mechanical switches that its operators used to tell it what to do. On the inside, almost 18,000 vacuum tubes carried electrical signals from one part of the machine to another.

Paul Allen and Bill Gates in the very early days.

By 1971 the firs microprocessor was developed at a company called Intel. That first chip was called the 4004 and had the same computing power as the massive ENIAC. The chip was only $1/16^{th}$ by $1/8^{th}$ of an inch, not 2,000 square feet. In 1975 the first two programmers ever employed were two Harvard students named Paul G. Allen and Bill Gates. The two eventually founded a new company called Microsoft that became a business empire and still is.

This time frame saw the Apple computers introduced by Steve Jobs and Steve Wozniak in 1977. Needless to say the invention of the personal computer would take many books just to cover the high points. Along with the Internet personal computers are perhaps one of the most innovative technology introductions of all time. What they are allowing humanity to accomplish is so impactful it's hard to find words big enough to sing their praise. In 1992 the Internet was invented. Text messaging was introduced one year later as was the GPS system we now use in our cars, smart phones and aviation.

Now—from your car—you can place or receive calls from any place in the world with General Electric's Simultaneous Duplex Mobile Telephone.

By 1973 the first mobile phone was installed in a moving vehicle. That eventually became the cell phone system over 70% of the earth's population uses today. But let's not get too far ahead of ourselves.

By 1982 the IBM computer was introduced. In 1983 the first GPS system was used in civilian aircraft. Today I personally use one made by a company called Garmin. This amazing device on one screen at one time tells me my direction, elevation, navigation points, speed, assent or dissent, the weather around me and even if other aircraft are nearby. It calculates fuel burn rates, estimated arrival times, even weight and balance for the particular aircraft I am flying and all this for the cost of a good pair of shoes.

In 1984 flash memory chips are invented. Today we can store up to 512 Gigabytes on a single chip for the price of a good dinner. Digital technology changes everything and very quickly. Like the affordable Model T that Henry Ford gave us, these high density digital storage devices make instant intelligence affordable to anyone.

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In 1958 the Boeing 707 introduced the world to the luxury of jet travel. That model plane is still used to this day in both military and civilian use. John Travolta even has one parked right outside his home in Florida! He flies it regularly from his private runway.

Almost everything since 1990 has to do with computers, digital information technology innovations and the Internet. In fact, it's hard to find much of the innovation in the past 25 years that is not somehow connected to these technology volcanos.

The addition of smart phones has ushered in a whole new way of distributing content.

One of the more mind blowing realities is how small the world of digital processing architecture has evolved. Back in 1982 when the IBM 286 was a big deal the processor used boasted a transistor count of 134,000. That was simply huge for its time. Today the 2015

SPARC M7 processor by Sun Microsystems / Oracle features 10 billion transistors and 32 cores. The typical i7 processor has 4 cores and 1.4 B transistors. The average $1,000 laptop has an i7.

Today five different space agencies representing 15 countries built the $100 billion International Space Station (ISS). It is the most complex international scientific and engineering project in human history. It is also the largest structure humans have ever put into space. This high-flying satellite is a laboratory for new technologies and an observation platform for astronomical, environmental and geological research. As a permanently occupied outpost in outer space, it serves as a stepping-stone for further human space exploration. This includes Mars, which NASA is now stating is its goal for human space exploration.

The space station flies at an average altitude of 248 miles (400 kilometers) above Earth. It circles the globe every 90 minutes at a speed of about 17,500 mph (28,000 kph). It can be seen moving with the naked eye at night.

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The International Space Station is a marvel of technology and a stepping stone to interplanetary travel for humans.

Want to know where we're headed by the year 2100? Look for next week's edition for a glimpse into the future of technology!

As always here are a few links for more data on this topic:
https://en.wikipedia.org/wiki/History_of_technology
http://content.time.com/time/photogallery/0,29307,2026224,00.html
http://www.ideafinder.com/history/timeline/the1900s.htm

Until next time I'm Will Robertson sending you good wishes from our team at Performance Strategies, Inc. / Management Consulting Group; Specialists in Change Management, Executive Communications and Sales.

For booking Mr. Robertson or any of our associates as a speaker, trainer, consultant or coach call 1-800-242-1900 or E Mail prospeaker@cox.net

In-person and online training programs are available at the corporate level.