

Invented in Fort Wayne, Indiana

Quest Club

October 25, 2024

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“Invented in Fort Wayne.” What does that conjure in your mind? Is it an historical question, as in “what was invented here in previous centuries?” Or perhaps you wonder about current advances in technology or have a desire to peer into the crystal ball to see how the people of our community will continue to innovate to make a difference well into the future.

Certainly, history gives more than a passing glance into the hearts and minds of those who came before us. It is intriguing to read about inventions created right here in Fort Wayne and how they have impacted and continue to affect people around the world. It is safe to say that this community has produced more than its fair share of remarkable inventions and innovations.

As you might imagine, this has been a topic of previous Quest papers, most notably papers on “Indiana Inventors” by Lockwood Marine in 1998 and one on “Indiana’s Rich Traditions in Medical Inventions,” by John Rogers in 2002. Both papers were helpful in exploring the ingenuity of those who came before us.

Many are familiar with the typical litany of Fort Wayne inventions, including television, self-measuring pumps, outdoor lighting and calculators. We love to talk about these things with typical Hoosier humble pride at cocktail parties. As I delved into this topic, I started pondering the difference between invention, innovation and adaptation, all of which are inter-related. It is helpful at this point to present some definitions:

*Invention* is the act of bringing ideas or objects together in a novel way to create something that did not exist before.

*Innovation* refers to the development of new ideas or the improvement of existing ideas.

*Adaptation* is the act of changing something to make it suitable for a new purpose or situation.

Today, I'll highlight some lesser-known Fort Wayne inventions, then discuss some that were adapted over the years and then move into some innovations happening right here, right now, that are literally taking us out of this world.

Let's start with Samuel Hanna, a man who could rightfully be called the inventor of Fort Wayne. In *Here's Fort Wayne Past & Present*, historian Michael Hawfield highlights the importance of Sam Hanna's accomplishments. Sam devoted his life to making the community of Fort Wayne viable and prosperous. He was the first ardent promoter of Fort Wayne and in several important ways he was its real founder.

Born in Kentucky in 1797, and raised on a farm in Dayton, OH, Sam was a teenaged entrepreneur dabbling in dry goods, which did not turn out well for him. Undeterred, at the age of 22, he again tried his hand at business in an Indian trading venture in the primitive settlement at Fort Wayne in 1819. This time, his business flourished, and Sam Hanna began to make his mark in building the new town of Fort Wayne. He was named the first postmaster in 1823, then elected associate judge of the Circuit Court. He had a personal interest in promoting Fort Wayne because he wanted to attract settlers to the swamp-locked village so that they could shop in his store and buy his parcels of land. To that end, Sam took the lead in developing plank, or log,

roads in and out of Fort Wayne, including the Lima Plank Road leading north, the Piqua Plank Road (today's Calhoun Street) leading southeast and the Goshen Plank Road to the northwest.

But the plank roads were not enough, and Sam soon innovated by turning to canals. He envisioned a canal connecting Lake Erie to the Ohio River and surmised it would be critical for the survival of Fort Wayne. By this time, he had been elected to the state legislature and worked for legislation that provided for the canal, which had a groundbreaking in 1832 and was fully completed in 1843.

But even these early efforts at transportation were still not enough to make Fort Wayne thrive. Railroads were taking the world by storm and Sam could see that they might bypass Fort Wayne unless action was taken. Thus began Sam's most ambitious enterprise yet: the founding of the Fort Wayne railroading industry, with the first central line opening in 1854.

According to Hawfield, "Sam's last great effort to enrich the community came just before the outbreak of the Civil War when he persuaded the directors of the Pittsburgh, Fort Wayne and Chicago Railroad to build their all-important repair and construction shops in Fort Wayne—the great Pennsy Shops that for a century dominated the Fort Wayne industrial world. With this effort, Sam Hanna had at last realized his dream of making Fort Wayne a growing and prosperous place for business." (Hawfield)

A multitude of prior Quest papers have referenced Sam Hanna in greater detail than what I've been able to include in this paper; I would highly recommend those to you. I'm certain he would

be an excellent topic for a future paper, and I think Sam would be very interested in the push over the last ten years to bring passenger rail service back to Fort Wayne, which has been relegated to a station in Waterloo since 1990. There has been growing support to create the Midwest Connect Corridor connecting Chicago to Fort Wayne, Columbus and Pittsburgh, with a number of other proposed stops to gather passengers and fill the trains. “This train service will enhance economic development, tourism and provide a much-needed transportation alternative for our citizens,” wrote Geoff Paddock, City Councilman and member of the Northern Indiana Passenger Rail Association in last weekend’s Journal Gazette. The push to bring people to and through Fort Wayne goes on to this day.

Forward-thinker Sam Hanna set the stage for movement in and out of Fort Wayne. That allowed people to move here to establish themselves and start inventing. Quester Todd Pelfrey, who is the executive director of the History Center, has been very helpful as usual when researching local history. I thank him for connecting me to an issue of the *Old Fort News* from 2016, which included details on the next several early Fort Wayne inventions.

“Among the earliest inventions associated with Fort Wayne was baking powder. Just prior to 1865 and the end of the Civil War, Cornelius and Joseph Hoagland and their partner Thomas Biddle, who operated a drug store at Columbia and Calhoun streets, developed the formula for the product that became known as Royal Baking Powder. Later it was a household name and the most widely distributed baking powder in the world. It also was in this same three-story brick building that Thomas A Edison, then a very young man from Port Huron, Michigan, had lodgings for about six months as a new telegraphic operator for the railroad.” (Old Fort News v 79)

“Parents in the first half of the twentieth century faced a puzzling challenge—how their children could use the toilet without falling into the bowl. Gertrude Muller’s invention solved this problem. The Toidey Seat was a child-sized collapsible toilet seat that could be attached over a standard toilet bowl or used with its own basin and frame. Gertrude presented the idea to the Van Arnam Company where she was an assistant manager and was told it was not feasible. Gertrude was convinced it was a great idea and started the Juvenile Wood Products Company in 1924. Marketed to department stores and baby specialty shops, the Toidey Seat soon became a fast-selling item. Gertrude was a dynamic and successful businesswoman, and her company developed other baby products, the most notable being a child’s automobile safety seat.” (Old Fort News v 79)

I was especially interested in this story because I remember my grandmother telling me that when she started driving, she not only taught herself to drive, but also had to figure out how to keep her two young toddler boys safe in the car in the late 1920s. She was a very clever woman and told me she took her large scarves and simply tied them to the seats. I do love imagining my father in that car! Grandma could have used two of those early car seats.

“By the late 1940s and early 1950s the Toidey Company (which was renamed after 1945) and its founder were recognized by the National Safety Council and the American Medical Association as a pioneer of children’s safety products. After Gertrude died in 1954, the Toidey Company was bought by a group of investors and continued to manufacture baby furniture until the late 1970s (Old Fort News v 79)

In the *History of Fort Wayne and Allen County, Indiana, 1700-2005*, historian Michael Hawfield writes, “Another notable enterprise that involved the Fort Wayne Electric Works after it became part of the great General Electric Corporation was the modern refrigerator. This invention centered, in fact, on the first hermetically sealed compressor motor. This was the invention that made possible the electric refrigerator, an appliance that is found in almost every modern household. Before 1924, the principles of electric refrigeration were well known, but combining an electric motor with the refrigerant compressor resulted in leaks and other problems that kept the invention off the market. In 1924, however, Clark Orr of the Fort Wayne Works and another engineer in Schenectady, NY, solved the problem and produced a totally sealed single motor-compressor unit. The result was the famous Monitor Top refrigerator that made home refrigeration possible and was produced in Fort Wayne from 1924 to 1934. This was one of the most successful consumer products made by General Electric.” (*History of Fort Wayne and Allen County, Indiana, 1700-2005*)

“The years of the Great Depression also saw a number of notable inventions originate in Fort Wayne. One of the more interesting came from the Capehart Automatic Phonograph Company. This company was started by Homer Capehart, a US senator from Indiana, in Huntington in 1928. The next year, Capehart move the operation to Fort Wayne and in 1931 he patented his coin-operated, record-playing machine, called the “jukebox,” which he sold to the Wurlitzer Company.” (*History of Fort Wayne and Allen County, Indiana, 1700-2005*)

“Specialization in motors, depending on the specific appliance needs, became the hallmark of motors made in Fort Wayne since World War II. The earliest Fort Wayne example was the motor

developed for the first electric garbage disposer. Manufactured in Fort Wayne at the General Electric Winter Street plant beginning in 1939, this early electrical household gadget was called Bill Morrill's Electric Pig in honor of its inventor, Wilbur Morrill." (*History of Fort Wayne and Allen County, Indiana, 1700-2005*)

In 2002, John Rogers' Quest paper "Indiana's Rich Traditions<sup>2</sup> in Medical Inventions," discussed another lesser-known item: "Schomburg Stomach Powder was a product similar to Alka-Seltzer and Goody's Headache Powder. Mostly bismuth subgallate, it was taken orally and helped to settle an upset stomach. It was concocted and finally patented by long-time Fort Wayne pharmacist Roy Schomburg with help from his father Carl in 1947." (Rogers) Many people know a version of this product today as Pepto-Bismol.

Magnavox was an important company associated with invention, innovation and adaptation. The *Old Fort News* says, "Magnavox is credited with coining the term 'stereophonic' in 1935 by Austin Armer, an engineer in the Fort Wayne laboratories. He was struck by the 'live dimension' of his new dual speaker system and coined the term 'stereophonic' or 'stereo' for the new system. Stereophonic sound is created when two separate tracks are recorded using multiple microphones and requires two separate amplifiers and speakers for sound reproduction. In 1937, Magnavox engineers invented the first high-fidelity (or 'hi-fi') phonograph. In 1958, they were the first company to produce instruments capable of playing new stereophonic records that recreated the realism of a live performance." (Old Fort News v 79)



“Four years before the release of Atari and Intellivision, Magnavox Consumer Electronics Group engineers, working with inventor Ralph Baer, produced the Odyssey home video game in 1972. A cross between a board game and an electronic game, the first version of Odyssey had clue cards, score cards, 19-inch television screen overlays and controllers. The Odyssey II was produced in 1979 but was not able to compete with more advanced game systems and was discontinued in 1983. The Odyssey I included a ping pong game similar to the Pong game for which Atari became so well known. Magnavox filed suit against Atari over the similarities in 1974 and settled out of court.” (Old Fort News v 79)

Lockwood Marine’s 1998 Quest Paper on “Indiana Inventors” discussed innovation and adaptation at Magnavox: “Many developments in one given area of activity often lead to the use of these developments or principles in many other areas. As an example, the work done on transmitting an EKG by telephone line led to other communications improvements, including one of the first practical fax machines called the Magnafax, which was produced for Xerox and has since been produced by 3M . . . Many of these same developments led to significant improvements in underwater sound detection. The government purchased and employed more than six million of the constantly improved Magnavox Sonabuys for submarine detection. Some of these same developments were used in the ARPANET in which Magnavox was involved with a government research group to develop a link of the United States’s ten largest computers. This net was a precursor to the current worldwide web or Internet. Many of the devices and technologies developed by companies such as Magnavox and ITT were never patented because they were under military-sponsored research and were protected by secrecy clauses. This included a lot of the underwater sound detection technology as well as communication

technologies, which ultimately led to pieces of the Internet and the global satellite positioning system.” (Marine)

One of the most impactful Fort Wayne inventions is magnet wire. In *Here's Fort Wayne Past & Present*, Hawfield, writes: “Less obvious an invention, but perhaps even more fundamental to our daily lives, was the invention by George Jacobs in 1911 of a practical and economical method of coating electrical wiring, giving birth to the magnet wire industry and establishing Fort Wayne as the world’s center in the production of this all-important material even today. It is difficult to overemphasize the importance of magnet wire to modern technology and our everyday life. Things that are taken for granted, such as radios, telephones, large and small engines, automobiles, computers, hearing aids, television, etc. all would be impossible without magnet wire. The enamel coating of copper wire is a necessary process that allows the wire, which may be drawn thinner than a human hair, to be wrapped in coils to produce the magnetic fields required for these things to operate. Although the theories of magnet wire were well understood at the turn of the century, the technological ability to coat, or insulate, wire was very limited. George Jacobs, a young engineer working at the General Electric plant in Fort Wayne, was determined to solve the problem by devising a way to bake an insulating coating onto wire of any size.” (Hawfield)

“George left GE in 1905 and moved to Cleveland with his young wife, Ethel Mossman, the daughter of a prominent Fort Wayne hardware merchant, and the two experimented together on ways to solve the coating problem. Ethel’s mother died in 1910, and her father wanted Ethel and her husband back with him in Fort Wayne; he offered to set up the young Jacobs in a small

laboratory/factory at the end of Wall Street, and there, in 1911, George Jacobs finally perfected a method to coat wire in special enameling ovens. The Dudlo Wire Company was founded and soon became a world leader in producing this all-valuable material. The new Ford Motor Company, especially, used tons of magnet wire in the manufacture of its Model T electrical systems. Although the Dudlo Company did not survive economic problems in the 1920s, the wire industry emerged stronger than ever in the midst of the Great Depression with the founding of Essex Wire Company, Rea Magnet Wire and the Phelps Dodge Wire Company.” (Hawfield).

As a side note related to adaptation, the *Old Fort News* reports that “after the Dudlo Manufacturing Company laid the groundwork to make Fort Wayne the future magnet wire capital of the world, it moved into the production of tinsel, the tiny gold and silver threads that lend much charm to Christmas decorations. Although European tinsel dominated the market, Americans began experimenting with producing tinsel in the late nineteenth century. Fine wire was flattened between two highly polished rollers into a very thin silver or gold ribbon. While Dudlo was manufacturing wire that opened new horizons for electricity and electronics, the Leonie Division of Dudlo was organized in 1916. The success of this new division was gradual; in time, Dudlo’s Leonie Division became recognized as a serious contender in the American tinsel market. Dudlo’s expansion into tinsel production exemplifies the diversification that reflects the continual refinement of Fort Wayne industry as a whole.” (Old Fort News v 79)

Fast forward 100 years and innovation and adaptation have revolutionized magnet wire into medical microwire, a key component manufactured by Fort Wayne Metals for use in lifesaving medical devices.

Fort Wayne Metals had its start in 1946 when Ardelle Glaze invented magnetic recording wire. As a young man, Ardelle attended the Illinois Institute of Technology and began his career distilling bourbon, spending time in the baking industry and machine repair business before moving on to medical science. His ECHO brand magnetic recording wire was the dominant media in the 1950s. After many years of running Fort Wayne Metals, Ardelle sold the company to Sylvania GE in 1968 in order to focus his attention on the budding medical device market.

After the sale, Ardelle's colleague, Bill Cook of Cook Medical, brought a problem to Ardelle that especially shifted his attention to medical grade wire. Ardelle solved a key problem of heart access wire fracture by introducing clean vacuum-melted stainless steel drawn with a bright and extremely smooth surface quality. This success catapulted Fort Wayne Metals as a sought-after medical subcomponent producer and it remains so today after the introduction of hundreds of life-saving metal solutions.

Fort Wayne Metals Research Products was created in 1970 and has become a world leader in the production of medical microwire, with more than 90% of the materials it produces ending up in the human body.

It is hard to comprehend, but products such as Fort Wayne Metals' shape memory microwire, ultra strength microwire and absorbable "vitamin" wire help heal brain aneurysms, remove clots that save brain cells, provide better navigation during surgical robotics and help heal bones and blood vessels.

Jeremy Schaffer, director of research and development, started working at Fort Wayne Metals in 1999. He was my source for most of the details about Fort Wayne Metals in this paper and has seen the company go from about 150 to more than 1,500 employees with a similar increase in life-saving impact, mostly by means of high-fidelity, implantable materials. Jeremy describes it as “life-saving metal. We make the best metal for medical care in the world.”

Reading the abstracts about these miraculous wires requires much tenacity. Jeremy tried to explain it to me in more simple terms, particularly the delivery and implantation of medical devices. He explained that arteries are highways, and a catheter is the delivery system, or conduit. Fort Wayne Metals makes materials that navigate blood vessels. Think of stents that divert blood flow and prevent aneurysm rupture in the delicate arteries feeding the human brain. Fort Wayne Metals is a pioneer of new materials that improve and save people’s lives multiple times a day in a myriad of forms. They have developed nutrient metal technology that will (and is beginning to) revolutionize the medical device industry by alleviating long-term side-effects associated with permanent metallic implants. It is “absorbable metal” and is designed to support healing and harmlessly disappear or step away so the tissue (bone or blood vessel) can operate the way it is supposed to. Imagine a bone screw or stent that aids in improved healing but never sets off an airport security alarm. Their products are continually adapted for new uses.

An example is nitinol, a metal alloy made of nickel and titanium, which looks like a wire, tuned to nano scale. It might be described as rubber metal. It has shape memory. Discovered in 1958 at the US Naval Ordnance Laboratory, its name is derived from the first two letters in both nickel and titanium, with the last three letters an acronym of Naval Ordnance Laboratory) and it is

manufactured at Fort Wayne Metals. This amazing product has a multitude of uses, and while Fort Wayne Metals did not invent it, they are continually adapting and innovating with it, as well as inventing new processes and alloy variations to solve key emerging problems.

One adaptation Fort Wayne Metals has performed is the replacement of some of the alloy's atoms to create a nickel-free surgical staple that is safe to use in people with nickel allergies. The material is "super-elastic" like its nitinol cousin, but the titanium is mixed with elements such as niobium that are expected to be allergy friendly, an important trait for a component that may stay in someone for life.

Jeremy explains that Fort Wayne Metals is most successful when solving a customer problem. For example, Fort Wayne Metals has worked with their customer NASA Glenn Research Center in Cleveland and used their knowledge to create a space tire from mesh they created out of nitinol. This space tire is airless, making it usable on other planets, first as a prototype spring tire for Mars rovers and now for the development of various lunar applications. According to a June 2023 Fort Wayne Metals press release, nitinol transcends traditional materials performance and provides engineers with an extremely tough, lightweight material capable of performing numerous tasks across a wide range of temperatures and conditions.

Materials engineers at Fort Wayne Metals and NASA are experimenting with and chemically engineering future nitinol materials to adapt to those harsh conditions and allow crewed and uncrewed rovers to successfully explore uncharted regions of the moon.

Fort Wayne Metals expects to produce lunar environment-ready nitinol materials and have commercial off-the-shelf supply available by 2026 for use by future lunar rover providers.

According to Jeremy Schaffer, “For Ardelle, innovations that created life-saving aortic wire were built off aircraft component experience. For Fort Wayne Metals today, innovations for space hardware were built off medical component experience. This beautiful cycle of innovation to help mankind is expected to continue and increase right here in our backyard.”

It remains to be seen how Fort Wayne Metals and others will continue to invent, innovate and adapt, but you might ask yourself how it came to be that Fort Wayne is home to these, and many more, incredible inventions. Further, how can this environment be sustained well into the future?

Let’s return to Sam Hanna, a significant founder of Fort Wayne. More than 200 years ago, his vision was to create a Fort Wayne that was accessible, welcoming and business-friendly to encourage people to move here by continually improving transportation. This is not so different from today.

Our local economic development organizations are in the same business. The Northeast Indiana Regional Partnership’s slogan is “pioneer starts here,” and their Vision 2030 plan states, “Uniting the region with a common mission and vision for Northeast Indiana ensures that we develop strategies to build a globally competitive region and to support our mission to increase business investment.

Greater Fort Wayne Inc. is the chamber of commerce and economic development organization for Fort Wayne and Allen County, Indiana. They focus on supporting local business, attracting new business, and improving our community's quality of place to grow jobs, wages, and the economy. (GFW website). Some of their reasons why Fort Wayne is a great place for business? We're competitive, we're in the middle of America's largest economies and we've got the homegrown talent to support industry. Greater Fort Wayne's Allen County Together economic development plan identifies the new steps to raise the bar and build a nationally recognized economy: High growth, innovation and inclusivity.

Fort Wayne, Indiana, has the resources to attract people to want to work and innovate here and I haven't even broached other resources such as quality of place, arts and culture, healthcare and housing. I asked Jeremy Schaffer from Fort Wayne Metals what he believes makes Fort Wayne a great place to invent, innovate and adapt. His answer: "Creative intersections combined with humility and grit, I believe, are critical to innovation success and Fort Wayne has these qualities in spades. Yes, innovation takes a new idea from the sketchpad to the medium of lives – to impactful use. The process of scaling an idea to real product is so complex and fraught with failure risks that require many hands and perspectives to solve and for this reason, innovation is more subtle than invention. Fort Wayne is full of people who are not only smart, but hard working and gritty, with a 'get it done' attitude, and approachable spirit. Further, we have growing academic institutions, a thriving downtown that invites creative intersections and humble leaders (like Scott Glaze) who find joy in reinvesting in our people!"

So, stay tuned! One thing's for sure: There's more to be invented in Fort Wayne, Indiana.



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Northeast Indiana Pioneer Starts Here, [www.neindiana.com/why-nei/economic-development Nitinol to enable space tire](http://www.neindiana.com/why-nei/economic-development-Nitinol-to-enable-space-tire) (and future automotive) tech

[Shape memory microwire](#) to heal brain aneurysms

[Ultra strength microwires](#) to remove clots (save brain cells), and better navigate by surgical robotics

[Absorbable "vitamin" wire](#) to better heal bones and blood vessels