CHAPTER 16

BROWNSVILLE'S INVENTOR GENIUS:
THE STORY OF ELISHA GRAY

So you thought Alexander Graham Bell invented the telephone?

Perhaps you will have second thoughts after you have heard the true story of a local man named Elisha Gray, who attended high school in Bridgeport (South Brownsville) and went on to enjoy a lucrative career as an inventor of various types of communications equipment, including the telephone and the fax machine.

Why haven't you heard of this Brownsville-educated inventor? Perhaps it is because on a February day in 1876, Elisha Gray became the unlucky poster boy for the old saying, "The early bird catches the worm."

It was on the afternoon of February 14, 1876, that Elisha Gray walked into the United States Patent Office and officially filed a document called a "caveat," which informed the government of his intention to patent a new gadget called a "speaking telephone."

Elisha was unaware that a few hours earlier on that same day, Alexander Graham Bell had visited the same office and filed an application for a patent on a similar invention. Bell's design was different from Gray's, and it is important to note that Bell's design later proved to be seriously flawed.

But in the ferocious court battle that erupted between these two "Fathers of the Telephone" over each man's right to claim the invention of the telephone as his own, it was Alexander Graham Bell who rang up a hard-fought victory in the nation's courts.

In this first article of the series, I will introduce you to Elisha Gray, who was raised in East Bethlehem Township (Washington County), attended high school on Prospect Street in Bridgeport, and went on to co-found the world-renowned Western Electric Company.

Among the sources consulted for these articles are the Oberlin College Archives, *History of Telecommunications from 1874 to 1930* by Charles Bourseul, *The Story of Elisha Gray* by Dr. Boyd Crumrine, "Heroes of the Telegraph" (web site), *History and Directory of the Three*

Towns by J. Percy Hart, the Bell System Memorial web site, *And That Was Brownsville* by McCready Huston, Britannica On Line, and *Elisha Gray and Miracles* by John H. Lienhard.

David and Christiana Edgerton Gray, an impoverished hard-working couple in search of a better life, packed their belongings and left western Pennsylvania. They took up housekeeping on a modest farm in Barnesville, Ohio, where their son Elisha was born in 1835.

Young Elisha developed a love of learning, which he nurtured in the Ohio public schools. Unfortunately, his dreams of academic achievement were shattered and his world was turned upside-down by the sudden death of his father. Feeling a responsibility to help support his widowed mother, the young teen quit school and looked for work.

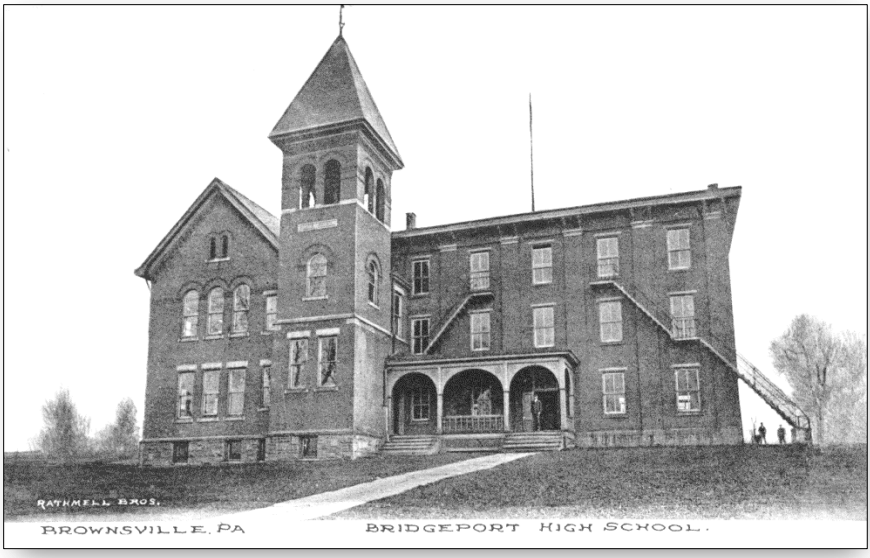
Not surprisingly, his mother Christiana soon remarried, tying the knot with Cozens Smith, a Quaker farmer who lived in East Bethlehem Township, Washington County, Pennsylvania. Christiana and Elisha moved to Cozens Smith's Pennsylvania farm. Elisha secured employment as a blacksmith's apprentice, but he soon discovered that he lacked the physical strength the work demanded.

He turned to carpentry and landed a job as an apprentice at Carver, Wood & Co., a planing mill and sash factory along the Monongahela River in Bridgeport (South Brownsville). He enjoyed working with his hands, and it appeared that a successful career as a craftsman might lie in Elisha Gray's future. But still flickering within him was his love of learning, particularly his fascination with applied science.

High on the hill overlooking the mill where Elisha labored daily at his carpenter's bench, there stood a handsome three-story schoolhouse that had just been constructed by the borough of Bridgeport. The new school opened in September 1853, succeeding a smaller 1838 stone building that had doubled as the town hall and stood just west of the borough's Market House.

The impressive three-story brick school, built at a cost of just under $3,000, was on "Hardscrabble Hill" between Prospect and Cadwallader streets on a site formerly occupied by the old Friends (Quaker) schoolhouse and meeting house and later occupied by the Prospect Street School.

The new school was remarkable because, according to Brownsville author J. Percy Hart, it was "the first graded school west of the Alleghenies, except in Pittsburg (sic) and that immediate vicinity, and that grand and efficient teacher, Prof. L. F. Parker, presided over [it]."

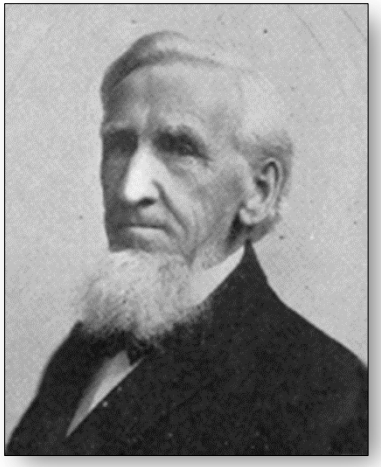


Professor Parker, a recent arrival from Oberlin, Ohio, was the principal of the new school, which opened its doors with one male and seven female "assistant teachers." Because it was a high school offering more than an eighth grade education, the school attracted many students from surrounding townships whose schools did not go beyond the eighth grade, including young men and women from across the river in Washington County. Most of the students were boys, and that brought dire warnings from some of the borough's citizens.

"If you get such a large crowd of boys together in one building," a few doubting Thomases predicted, "they would be unmanageable, and in fact would tear the building down."

But the building did not collapse from an influx of testosterone-laden scholars. "Their predictions did not prove correct," J. Percy Hart pointed out, "as Prof. Parker held the reins with a steady hand and the result was a grand success."

It is unclear whether students attending Professor Parker's school paid tuition as was often the case in those days, but Brownsville historian McCready Huston believed payment



Professor L. F. Parker

was probably involved.

"Free schools beyond the eighth grade were rare in the small towns of Pennsylvania in 1854," Huston wrote in his Brownsville *Telegraph* newspaper column, *And That Was Brownsville*. "Many boys from the Three Towns of the period attended the private Academy at Merrittstown. I suspect Mr. Parker's school may have been a private tuition venture."

One reason for Huston's conclusion is found in an unfinished and unpublished biography of Elisha Gray that was written by Washington County historian Boyd Crumrine. Crumrine, who also wrote the 1882 classic *History of Washington County, Pa.*, was a student at Professor Parker's school the year it opened. He noted that Elisha Gray, who was nineteen years old when the school opened, "had to work at the carpenter's trade in the planing mill of Carver, Wood and Co., Bridgeport, to pay his school expenses."

Elisha Gray, not willing to allow the ember of academic curiosity that smoldered within him to flicker out, enrolled at Professor Parker's school. Elisha arose early each morning and traveled to Carver, Wood, and Co., where he labored at the carpenter's bench in the early morning and evening hours and was allowed to attend the high school during the day.

In the evenings and on Saturdays, Boyd Crumrine and another classmate, Henry S. Bennett, would spend time in the grocery store of Seaborn Crawford near the Cast Iron Bridge, "teasing Mr. Crawford in various ways." Elisha, when he was permitted to be absent from his work, would often join his classmates there.

Thirty years later, Bennett, who was by then Vice President of Fisk University, visited his childhood friend Crumrine, who had become a successful attorney in Washington County. During their reunion, Bennett said to Crumrine, "Do you remember the time when we three were together in Seaborn Crawford's grocery one evening after school hours, and Mr. Crawford put down our names in the back of his large ledger, saying that he would put us there together, and see if any of us would ever amount to anything?"

How could anyone have guessed that of the three boyhood friends, one of whom became a leading lawyer and noted historian, and the second of whom became a Congregational minister and vice president of a university, it would be the carpenter's apprentice, the "reserved, more quiet, but also manly, studious and ambitious" Elisha Gray, who would leave the most lasting mark upon the world?

When the three boys graduated together from L. F. Parker's Bridgeport High School in 1856, all three enrolled in college. Gray and

Crumrine favored Oberlin College in Ohio because, according to Crumrine, the boys believed that "we must work our own way to an education, and preferred Oberlin College because of the opportunities that institution gave to students without means."

Bennett and Gray enrolled at Oberlin, but Crumrine's parents decided to send him to Jefferson College at Canonsburg instead. The year before the trio graduated from their respective colleges in 1860, Elisha Gray and Henry Bennett visited Boyd Crumrine at Canonsburg, on their way home from Oberlin.

It was the last time Crumrine would see or hear of his friend Elisha for a quarter of a century. When he finally did hear of him, he would be astounded to learn what the quiet carpenter's apprentice had accomplished in the twenty-five years since they had last seen each other.

Next, the true story of Bridgeport graduate Elisha Gray's invention of the telephone *and* the fax machine.

BRIDGEPORT HIGH SCHOOL GRADUATE FOUNDED WESTERN ELECTRIC COMPANY

In 1856, classmates Boyd Crumrine, Henry Bennett, and Elisha Gray graduated from Professor L. F. Parker's Bridgeport High School. The three college-bound boys bade farewell to Professor Parker and their Bridgeport classmates, among whom was a Quaker girl named Edith Griffith. Edith's sister Elizabeth married Joshua Milhous and became the great-grandmother of President Richard Milhous Nixon.

Professor Parker left town too, moving to Iowa where he became Professor of History at Grinnell College. Later he moved to the University of Iowa, and eventually he served as Iowa's State Superintendent of Public Instruction.

Boyd Crumrine, whose family home was in present-day Deemston, enrolled at Jefferson College in Canonsburg. His two friends, Henry Bennett and 21-year-old Elisha Gray, heeded Professor Parker's urging and enrolled at Oberlin College in Oberlin, Ohio, a school that Brownsville historian McCready Huston characterized as "a college liberal with aid and opportunity for poor boys." The cash-poor Gray continued his carpentry work at Oberlin to help finance his years of study there.

Gray excelled at the physical sciences, and after graduating from Oberlin College, he was appointed Professor of Physics at the school.

His deftness with tools and his scientific insight enabled him to devise various pieces of apparatus that he used in his classroom experiments. He became interested in electricity, inventing numerous devices that were useful in the fledgling telegraph industry. In 1867, he secured his first patent on an improved telegraph relay.

The telegraph business was growing fast. Inventor Samuel F. B. Morse had proven the practicality of the telegraph in 1844 with a dramatic demonstration to Congress, and in 1856, several regional telegraph companies had consolidated to form the Western Union Company. Western Union purchased its telegraphic equipment from two shops, one in Cleveland and one in Ottawa, Illinois.

The Cleveland shop manufactured fire and burglar alarms and telegraph instruments, and it prepared working models of inventions. One of the shop's best customers was a physics professor at nearby Oberlin College who often purchased parts and models for his experiments. The customer's name was Professor Elisha Gray.

According to information presented by historian David Massey on his excellent web site Bell System Memorial, Professor Gray became so involved with the Cleveland company that he approached George Shawk, one of the company's two owners, with an offer to become a co-owner of the business. Shawk refused, declaring that "Gray would want to put every man in the shop into his darned inventions."

Shawk's partner was a former Western Union chief telegraph operator named Enos Barton. While Shawk viewed Gray's potential involvement in the company as counterproductive, Barton saw it as an opportunity to bring in an inventor whose genius could be of great value to the company. Barton encouraged Gray to buy out Shawk's share of the company, and in 1869, Gray did so. The firm of Gray and Barton was born.

The two men recognized their company's need for more capital and tapped into a source of big money by taking on a third partner. That partner was General Anson Stager, general superintendent of the Western Union Company. Stager persuaded Gray and Barton to move their company to Chicago. Then three years later, Stager convinced William Orton, president of Western Union, to purchase a one-third share in Gray and Barton.

The influx of capital from the two influential Western Union officials was beneficial to the company, but it left Elisha Gray, Enos Barton, and the company's employees with only a one-third ownership of Gray and Barton. One-third was owned by Anson Stager, and the remaining third by William Orton.

In 1872 the company was reorganized and a new name chosen for it,

one that reflected its strong ties to Western Union. The company that was formerly called "Gray and Barton" became the "Western Electric Manufacturing Company." When the Ottawa, Illinois telegraphic equipment manufacturing plant was closed, it became clear that Western Union would rely upon the Western Electric Manufacturing Company to meet most of its growing needs for telegraphic equipment.

It was a heady time for a man who, less than two decades earlier, had been a student at Professor L. F. Parker's high school in Bridgeport, Pennsylvania, hoping that his carpenter's wages could help pay his way through high school and college. The former carpenter's apprentice, who had moved to Chicago in 1872, was now part-owner and chief scientist of the Western Electric Manufacturing Company.

Western Electric's profitability was closely linked to the business fortunes of Western Union, a company that was "poised to reap the fruits of a monopoly on transmission of news to America's newspapers," writes historian Massey. Western Union's success meant that its principal supplier, Western Electric, "seemed positioned to capitalize on the telegraph's position on the cutting edge of communications . . ."

As part-owner of Western Electric, Elisha Gray stood to profit greatly from his company's success. But Gray's greatest love was independent invention and research, and he wished to devote more time to his experiments in telegraphy.

To achieve that end, he sold his interest in Western Electric, retired from the company in 1875, and concentrated on discovering a way to increase the number of messages that could be sent simultaneously over a single telegraph wire. Gray theorized that this could be done by converting each message to a musical value ("electroharmonic telegraphy").

It was while he was doing his research into electroharmonic telegraphy that the "incident of the bathtub" occurred, a defining moment that yielded an insight which led to his invention of the telephone. Here is how Gray described the episode many years later.

"My nephew was playing with a small induction coil," Gray explained, "taking shocks, for the amusement of the younger children. He had connected one end of the secondary coil to the zinc lining of the bathtub, which was dry. Holding the other end of the coil in his left hand, he touched the lining of the tub with the right."

Gray's nephew's intent was to produce a slight shock for the kids' entertainment. As Gray watched the amusing demonstration, he noticed something remarkable.

"In making contact [with the tub with his right hand], his hand would glide along the side for a short distance. At these times I noticed

that a sound was proceeding from under his hand at the point of contact, having the same pitch and quality as the vibrating electrome [sic].

"I immediately took the electrome in my hand and, repeating the operation, I found, to my astonishment, that by rubbing hard and rapidly I could make a much louder sound than the interrupter or the electrome. I then changed the pitch of the vibrator and found that the pitch of the sound under my hand was also changed, agreeing with that of the vibrator."

It occurred to Gray that not only might he be able to produce different musical values with a device operating upon the principle he had witnessed in action at the bathtub, he could theoretically devise a mechanism that would convert vocal sounds into a form that could be transmitted telegraphically.

On February 14, 1876, Gray filed a caveat in the U. S. Patent Office in Washington, D. C., officially notifying the government of his expectation of perfecting the 'art of transmitting vocal sounds telegraphically' within three months.

What is a caveat?

A "caveat," as defined in Webster's dictionary, is "a description of some invention, designed to be patented, lodged in the patent office before the patent right is applied for, and operating as a bar to the issue of letters of patent to any other person, respecting the same invention. A caveat is operative for one year only, but may be renewed."

Elisha Gray was the thirty-ninth visitor to the Patent Office on that fateful day. His caveat put the U. S. Patent Office on notice that he was designing an invention for the transmission of voice via a telegraph wire, utilizing a microphone system he had designed.

However, earlier that day a Boston lawyer named Gardiner Hubbard, a financial backer of Gray's chief competitor, Alexander Graham Bell, had visited the same patent office. According to the patent office's records, Hubbard was the fifth visitor that morning, and he submitted Bell's application for a patent of the telephone. Based upon records of the respective times the two men visited that day, the U. S. Patent Office later awarded U. S. Patent Number 174,465 to Alexander Graham Bell for his invention of the telephone.

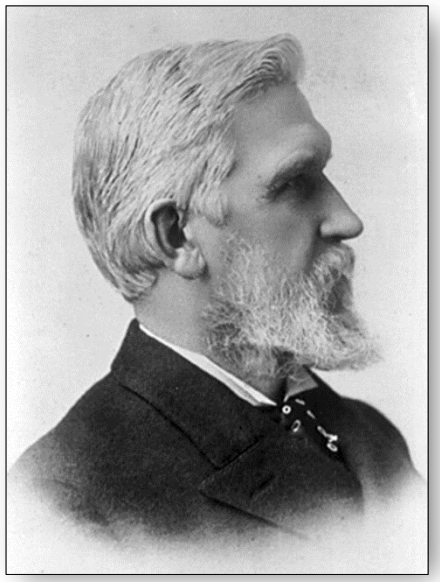
Gray filed a lawsuit in court, claiming that skullduggery had occurred within the patent office. Complicating the question was the realization within a year that Bell's patented telephone was worse at transmitting than receiving because its microphone was not sensitive enough. It took an 1878 invention by David Edward Hughes of a more sensitive carbon microphone to bring Bell's telephone up to acceptable quality. On the other hand, the microphone described in Elisha Gray's

caveat would have worked properly from the outset.

The question of which inventor had earned legal rights to the invention of the telephone was in court for years, but Elisha Gray did not rest while the matter was litigated. Instead, Gray continued his research, and his diligence led him to invent yet another device which is still widely used today – the facsimile (fax) machine.

Next we conclude the story of the career of Elisha Gray, the forgotten Bridgeport High School graduate whose Western Electric Company became one of the world's great business firms.

ELISHA GRAY DESERVES TOP BILLING IN BROWNSVILLE HISTORY



Elisha Gray

While attorneys battled in court to determine which man, Elisha Gray or Alexander Graham Bell, would be declared the official inventor of the telephone, Elisha Gray continued his research on other electrical innovations, acquiring nearly seventy patents over thirty-four years.

Despite the court's eventual awarding of the telephone patent to Bell, it is estimated that Gray earned over five million dollars during his lifetime on his own patents. His most successful invention was the "telautograph," a predecessor to the modern fax machine.

During Gray's climb to scientific prominence, his boyhood friend at Bridgeport High School, Boyd Crumrine of Washington County, Pennsylvania was surprisingly unaware of his former classmate's fame. In an unpublished biography of Elisha Gray that Crumrine wrote in 1902, he described how he learned that the quiet fellow whom he and fellow classmate Henry Bennett had known as a carpenter's apprentice had become a celebrity.

"In 1860, we all graduated," Crumrine wrote, "they [Henry S. Bennett and Elisha Gray] at Oberlin and I at Jefferson. From that time

Gray was lost to me for many years. But Bennett studied theology and became a Congregational minister, and I studied the law.

"[After the Civil War, Bennett] became Vice President of Fisk University, serving as such during his whole life thereafter. I settled in the practice of my profession at Washington, Pa., where I remained with an occasional letter from Mr. Bennett, but without meeting him or even hearing from or about Gray until 1884.

"In the summer of 1884, Bennett, then on a visit to his friends at Brownsville, paid a visit to me at Washington. I asked him, 'Mr. Bennett, what became of young Gray, our comrade of the Hardscrabble High School?'

"'Is it possible,' he replied, 'that you don't know who Gray is? Do you remember the time when we three were together in Seaborn Crawford's grocery one evening after school hours, and Mr. Crawford put down our names in the back of his large ledger, saying that he would put us there together, and see if any of us would ever amount to anything?'

"'I said to him I had an indistinct recollection of the matter . . .'

"'And don't you know who Gray is? Don't you know that Elisha Gray is the real inventor of the Bell Telephone, and lives at Highland Park, a suburb of Chicago, worth perhaps his millions, and is one of perhaps but two men in the United States who have received the Grand Cross of the Legion of Honor of France?'

"'What!' said I, 'I have been reading about that Elisha Gray in the newspapers and magazines for many years, and until this moment I never knew that he was the Elisha Gray who had to work at the carpenter's bench with Carver, Wood & Co. at Bridgeport, to enable him to attend the High School with you and me.'"

In 1887, three years after Bennett's visit, Crumrine wrote an article for the Washington *Reporter* in which he recounted the tale of the three Bridgeport High School classmates. He sent a copy to Bennett, who forwarded it to Gray in Highland Park. Shortly thereafter, Crumrine received a letter from Elisha Gray, his first contact with Gray since the two college graduates had parted company in 1860.

"Well my dear old friend," Gray wrote to Crumrine, "there has been a deal of history made since you and I met . . . I am at my old tricks again and I like it, devoting my whole time to science and invention. Just now I am bringing out an invention for writing at a distance by telegraph. So you can sit in your own room and give your own signature 100 miles away. I call it the 'telautograph.'"

Gray had invented the precursor to the modern fax machine. In an 1888 interview published in *Manufacturer & Builder*, Gray described his

invention in layman's language.

"By my invention," he explained, "you can sit down in your office in Chicago, take a pencil in your hand, write a message to me, and as your pencil moves, a pencil here in my laboratory moves simultaneously, and forms the same letters and words in the same way. What you write in Chicago is instantly reproduced here in fac-simile.

"You may write in any language, use a code or cipher, no matter, a fac-simile is produced here. If you want to draw a picture it is the same, the picture is reproduced here. The artist of your newspaper can, by this device, telegraph his pictures of a railway wreck or other occurrences just as a reporter telegraphs his description in words."

How much of a success was Gray's telautograph? After he demonstrated it at the Chicago World's Fair in 1893, it became a very popular device for the transmission of signatures and documents over great distances. In 1915, its manufacturers, Gray National and Gray Electric companies, reorganized as the Telautograph Corporation. After changing hands several times during the twentieth century, it is now part of the Omnifax Division of Xerox Corporation.

The same year that he invented the telautograph, Elisha Gray visited Boyd Crumrine at his home in Washington County. They had not seen each other since graduating from college twenty-eight years earlier. They would never see each other again.

"In an extended drive through the valleys and over the hills about the town of Washington one Sunday afternoon," Crumrine wrote years later, "the heart of the silent student was opened to the memories of our boyhood days together.

"He had brought with him for my pleasure two articles of the greatest interest to my family and others to whom they were exhibited. One of them was the medal he had received from the Paris Exposition of 1878 for his electrical inventions shown then together to the world of sightseers in attendance. The other was the Grand Cross of the Legion of Honor presented to him on the same considerations by Marshall McMahon, President of the French Republic, by order of the French Parliament."

During the 1890s, Elisha Gray turned his attention to the study of underwater communication. In December 1900, after two years of experimentation in Boston on signaling devices for submarines, he and his associates succeeded in transmitting signals underwater without wires for a distance of twelve miles.

It was a great scientific triumph, leading to the formation of the Submarine Signal Company in 1901. But the time for jubilation was all too brief.

Less than a month later on January 21, 1901, the genius who went to school on Prospect Street died unexpectedly in Newtonville, Massachusetts, at only sixty-five years of age. He was buried at Rosehill Cemetery in Chicago.

The following autumn, Boyd Crumrine wrote a letter to seventy-seven-year-old L. F. Parker, Professor Emeritus of History at Grinnell College, Iowa. Crumrine was writing to his former teacher at Bridgeport High School to thank him for sending three small books in memory of Mrs. Parker, who had also taught at the Bridgeport school.

"I was delighted to receive the three little books you sent me," Crumrine wrote to his aging mentor. "In that three-story brick school building, I got my start, and received the impulse toward the sturdy life I have tried to lead."

Crumrine described to his former teacher his final visit with Elisha Gray in the summer of 1888.

"He was then in his prime," he wrote, "and what a time we had for the week or so he was with me. Of course he told me everything about his telephone invention and controversy, and was then obtaining patents for his Telautograph, and believed himself to be very, very wealthy."

Crumrine concluded sadly, "Bennett passed away before either of us, then Gray. Of the trio in the back of Seaborn Crawford's ledger, wherever that may be, I am the sole survivor."

So what shall we make of the career of Elisha Gray, the scientific genius who was educated at Bridgeport High School on Prospect Street?

Shall we remember him as the frustrated and forgotten inventor of the telephone?

A week after his death, *Scientific American* said of him, "He was a man of marvelous talent and ingenuity, and in the opinion of many who have calmly weighed all the evidence, it is likely that he will receive justice at the hands of future historians by being immortalized as the inventor of the speaking telephone." Although Bell had won in court, "many persons hold that victory was a technical and corporate one, rather than one based on science."

But Elisha Gray's story is not a tragedy of unfulfilled potential. It is the glorious tale of an ingenious inventor and savvy businessman whose legacy is still evident today in the corporate world of electronics and communications.

The company that Elisha Gray and Enos Barton founded in 1869 (Gray and Barton) became Western Electric, the largest electrical

manufacturing company in the United States, and has evolved into Lucent Technologies.

Gray's telautograph company became the Telautograph Corporation, which is now part of the Xerox Corporation.

And yet another Fortune 500 company, employee-owned Graybar, is currently the nation's leading electrical distribution company. The firm is the former supply department of Western Electric, and it is named for its founders, Elisha Gray and Enos Barton.

It is unfortunate that the name and accomplishments of Elisha Gray have been forgotten in Brownsville, the place where he labored as a carpenter, received his high school education, and from which he ventured forth to become a true giant in the scientific world.

The final word on this great inventor's life shall belong to the late McCready Huston, a respected chronicler of Brownsville's history. Many years ago, Huston offered his judgment on the career of the carpenter's apprentice-turned-inventor.

"Elisha Gray," Huston wrote, "belongs with Brownsville's John Brashear in the pantheon of scientists.