Doctor Isaac Adams, Distinguished Inventor

COMING TO GLOUCESTER

In the summer of 1870, Dr. Isaac Adams, at age 33, was a world-famous inventor and businessman. As a 22-year-old student at Harvard Medical School, he had invented the world’s first nickel plating process. As it turned out there was a myriad of profitable applications for nickel plated products and the Doctor found a high demand for his proprietary technology. Europe was a large market for nickel-plating, and he had just returned from an extensive European business trip. He also brought back his new wife, Lucille, whom he married on this visit. They had met a few years before on a previous trip to Paris and fell in love. Lucille had two young daughters whom Isaac had come to care for as well.

Initially, they set up their home in a cozy residence at 11 Shepard Street in Cambridge, Massachusetts, less than a mile from Harvard Square. But the Doctor wanted his family to have a summer place where they could enjoy the ocean. His Cambridge neighbors, the Mellen and Davis families, recommended the Annisquam section of Gloucester, Massachusetts where they owned summer retreats. They invited the Doctor to come with them for a visit.

The Adams family packed their bags and hopped on the train from Boston to Gloucester. There they hired a horse-drawn carriage to take them to Annisquam. As they drove across the wooden bridge into the Village, they could see the wharves and cottages along the shores of Lobster Cove and immediately fell in love with the place.

The Doctor and Lucille spent some time searching for the ideal property, but finally settled on a large tract of land up the hill from the Village which covered most of what is now called Adams Hill. The land, at that time, had had nearly all of its trees cut down by previous owners for firewood and shipbuilding. The elevation at the peak was one hundred feet above sea level, open and devoid of most vegetation and structures. Thus, from the top of the hill, there was a spectacular 270° view of Ipswich Bay to the west, the Annisquam River Estuary to the South, and Lobster Cove to the East. In 1871, Adams built a large summer home which he called “The Homestead.” Part of it still stands on the original site and is owned by the Gorton family.
During the early part of the 19th century, a small granite quarry, one of many around Cape Ann, had operated near the site of Adams’ home. An old quarry pit, filled with water, was used to advantage by the Adams family to support a glint of goldfish.

According to E.H. Davis, a family friend, “The house capped a high granite cliff and commanded a very grand view. It had French windows on three sides, with a wide, covered piazza extending around all but the kitchen end of the house. There was a small machine shop downstairs (where the Doctor built equipment for his experiments) and a billiards room upstairs.”

Later, other structures were added to the extensive property including barns for horses and cattle. The ocean was a focus of family life, so Isaac added a small beach house on what is now called Cambridge Beach.

The Adams family took root in the beautiful area and lived there for the rest of their lives. Two sons were also born; Walter Owen in 1876 and Isaac Rayne (Rayne) in 1880. Although the Doctor maintained his Cambridge home, he lived in Gloucester long enough each year to officially be a resident of that city rather than Cambridge. Over the ensuing years, Isaac conducted many of his experiments and technology developments in “Squam.” Gloucester played a powerful role in Dr. Adams’ later career and achievements.
Long after the Doctor’s passing, a section of the house containing the tower and kitchen area shown on the right side of the building in the photo above was moved across the road to a separate location and continues there as a residence.

THE INVENTOR AND THE INVENTOR’S SON

Dr. Isaac Adams, Jr. became a world-renowned inventor during the latter half of the 19th century. He was preceded in that endeavor by his father, Isaac Adams, Senior. In 1830 at the age of 28, Adams, Sr. invented the Adams Bed and Platen Press, the world’s first powered printing press for the rapid production of high-quality books. This was a remarkable achievement at the time since this innovation made possible the availability of fine books to the average person.

Isaac Senior’s primary business, located in South Boston, was manufacturing manual and powered printing presses of his own design. An Adams Acorn Manual Press manufactured by I. Adams & Co. is shown here.

One of the Adams Acorn Manual Presses is on display at the Cape Ann Museum in Gloucester. It is part of the Folly Cove Designers collection and, for many years, was in the rear of the auditorium.

In addition to his printing press business, the elder Adams had large real estate holdings and a range of other businesses including a shipyard and a sugar refinery. He was successful and wealthy, but he lacked one thing: as a poor farm boy from New Hampshire, he had never received a full formal education. Now, though he moved in the highest circles of Boston society, he felt inadequate among his peers. This created a strong need to have a son that would become a well-cultured gentleman, able to operate easily in Boston’s upper classes. The elder Adams provided young Isaac with the best education money could buy. First, he was sent to a private school in Sandwich, New Hampshire up to the ninth grade. Then on to high school at Chauncy Hall, located in Boston’s Copley Square.
When Isaac, Jr. was ready to move on to higher education, he entered Bowdoin College in Brunswick, Maine. The young man focused his studies on the sciences and managed to do very well in his academic career. He found time for non-academic pursuits as well. He joined the Chi Psi Fraternity and the Athenian, a social club.

Isaac, Jr. graduated from Bowdoin College in 1858 and, at his father’s insistence, moved on immediately to Harvard Medical School in Boston. Young Isaac’s grades were adequate for entry into medical school, and his father’s connections assured his acceptance.

At Harvard, Isaac, Jr.’s life took a new direction when he became associated professionally with Professor Josiah Parsons Cooke. As the Erving Professor of Chemistry and Mineralogy, Cooke was a leader in his field of electrochemistry. With the opportunities offered by the state-of-the-art facilities at Harvard and his father’s example of seeking creative innovations with technology, Isaac Adams, Jr. took naturally to research. He showed considerable talent in the field of electrochemistry and was mentored by the well-known professor.

Young Adams, under Cooke’s tutelage, studied the electrolytic possibilities of nickel and cobalt salts and made considerable progress in the field. During 1858 and 1859, at the age of 23, he was responsible for developing the first plating process that produced practicable results using nickel. He was able to deposit nickel coatings of three to five-thousandths inch thickness on three by four-inch substrates. This was considered by his professor to be a remarkable achievement.

Adams, however, did not apply for a patent at that time. But Professor Cooke noted in writing the efficacious results of Adams’ research. Cooke also maintained in his offices the laboratory books and examples of Adams’ successful plating process. This information would be especially useful later when the Doctor finally did apply for the patent.

Upon learning of his son’s nickel-plating process success, Adams, Sr. was enormously proud. He insisted, however, that Isaac, Jr. complete his medical degree and go on to become a Bos-
ton physician. He would not be denied his long-standing dream. Isaac Jr. was every bit the loving son and did everything that his father asked. He graduated from Harvard in 1862.

**ON TO PARIS**

Isaac’s Harvard mentor, Professor Cooke, had previously studied in France under French Chemists Jean Dyman and Victor Regnault. The Professor’s stories about the academic environment in France intrigued young Adams and he wanted to go there to continue his technological pursuits. He was able to convince his father to finance him to continue his medical studies in Paris. There, Isaac enrolled at L’École de Médecine, an international center for medical studies. Although Adams did work on advanced medical practices while in Paris, he focused his efforts mainly on chemistry, especially electrochemistry. He also studied and practiced the art of glass blowing for scientific applications. One of the glass items that he became proficient in producing was a Geissler tube. He acquired this technology from Monsieur A. Gaiffe, a Paris-based instrument maker and chemist, who later became a partner in the Doctor’s nickel-plating business.

At the time, Geisler tubes were used to illuminate surgeries. This started in Paris when a physician named Dumas was among the first to experiment with Geissler tubes as surgical lamps. When young Isaac learned of this development, it sparked his interest in the technology. Today, neon is commonly used as the gas in shaped, linear glass tubes and has wide applications in signage. But, at the time, very few people were familiar with this phenomenon.

Isaac’s two years in Paris had a major influence on his life. Not only did he learn new skills, but he acquired a taste for the culture of France which remained with him the rest of his life. Manufacturing the Geissler tubes would later help him to earn his livelihood back in Boston with their sale for various applications including surgeries. It would also lead to his invention of the electric light bulb fourteen years before Thomas A. Edison.

**START OF HIS “MEDICAL PRACTICE”**

Dr. Isaac Adams, Jr., age 28, returned from Paris to Boston in 1864. The Civil War was still raging and there was now a draft implemented for men of his age. Though he was physically fit and had a skill needed by the Union Army, young Isaac did not join the corps, nor was he
drafted into the service. His father took advantage of the legal option, used by many wealthy families, to pay a “commutation fee” of $300 for his son, exempting him from service.

Isaac, to please his father and for his continued financial support, opened an office for his medical practice at 763 Federal Street in Boston and moved in with his brother, Aquila, at 43 Chester Square in the South End.

Unbeknownst to his father, it was always Isaac Jr.’s intention to earn his living with his knowledge of chemistry and physics and not the practice of medicine. He saw a market and began to manufacture and sell a large number of Geissler tubes of various sizes and designs. These tubes were purchased by E.S. Richie of Boston, an instrument manufacturer, Chester Brothers of New York City, and his old mentor at Harvard Medical School, Professor Josiah Cooke, and others.

An inventor to the core, like his father, Isaac sought to improve the functionality of his products through technological innovation. The objective of the Geissler technology was to produce useful light for various applications. His notebooks at that time indicate that he undertook a series of experiments with incandescent lighting using the Geissler manufacturing technology. The objective for his research was to use “a thin strip of carbon material, enclosed in a highly exhausted Geissler tube so that (the filament) would remain stable for a long period when brought to incandescence by an electric current.”

His first successful lamp of this type was produced in 1865. This was fourteen years before Edison developed an electric light bulb of essentially the same design.

Dr. Adams did not patent this invention, saying later that he saw no immediate use for it. He was not interested, nor financially capable of developing the electric power system that would be necessary to use the bulb for residential electric lighting. He later testified in a trial brought by an electric light bulb manufacturer against Thomas Edison. Ultimately, Edison was found by the court to be the inventor of the electric light bulb.

It is remarkable to note that Thomas Edison, after a long and arduous experimental program, invented virtually the same design for his light bulb in 1879, fourteen years after Adams had perfected his bulb. But Edison also designed and developed the electric power system capable
of providing energy to homes to use the bulbs for lighting. He had his first public demonstration of the lighting system in Menlo Park, New Jersey on New Year’s Eve in 1879. The Pennsylvania Railroad Company even ran special trains to Menlo Park on the day of the demonstration in response to public enthusiasm over the event. And so, Edison won in the electric light bulb trial.

Dr. Charles Wrege, a professor at Princeton University, concluded in his investigation of Dr. Isaac Adams’ role in the development of the incandescent lamp that the Annisquam resident deserved credit for the invention. Wrege said, “Adams’ testimony (in the Edison light bulb trial) reveals him as a truthful man who did just what he said he did. In fact, it is very possibly because of this adherence to the truth that he has not been given proper credit, in previous histories of the incandescent electric lamp, for his contribution.”

THE BIRTH OF THE NICKEL-PLATING INDUSTRY

Toward the end of 1865, Joseph Smith, a Boston manufacturer of gas lamps, approached Isaac to develop an improved gas tip made from cast iron. Smith was seeking a replacement that was technically and economically superior to the plain iron tip currently being used on Smith’s lamps. Based on his success in nickel plating when he was at Harvard, Isaac speculated that this process might be applied on iron to accomplish Smith’s objective. He worked diligently to develop the plating process for such applications. He then plated more than 1500 of the iron tips for Joseph Smith’s gas fixture company.

With these measurable results in hand, Dr. Isaac Adams, Jr. finally filed for a patent on his nickel-plating process on July 16, 1866. It was issued on August 21, 1866, a little more than a month later. This was the beginning of his major business success with nickel plating that would make his reputation and his fortune. The technology that is used for nickel plating today is basically the same as developed by Dr. Adams.

The demand for nickel plated products grew dramatically over the ensuing years and the number of requests for licenses from Dr. Adams for the technology expanded. Granting these licenses for a stream of royalty payments is how Dr. Adams and his partners made their fortunes.
1869 - AN IMPORTANT YEAR FOR ISAAC

By 1869, Isaac was focusing all of his attention on nickel plating. As it turned out, 1869 was a most important year for the development of nickel-plating technology and the nickel-plating industry. In that year, Isaac filed and had issued four additional major patents on his process, including the key patent which covered the process to purify nickel to the point that the metal was useable for plating. He was also instrumental in starting three additional companies with the objective of commercializing the technology.

In March 1869, an opportunity emerged to take over another nickel-plating company based in Boston. The company had been started by William H. Remington, who had developed his own nickel-plating process. Dr. Adams recalled, tongue in cheek, that Remington had a partner in the business. It was a woman who was a spiritual medium. Her role in the company, according to Adams, was to call upon the spirits to bring useful information to Mr. Remington so that he could be successful with his plating process. Unfortunately for Remington, his process worked, but only sporadically. His financial backer became frightened of losing all the money he had invested so he called in Moses Farmer, a New Hampshire inventor, who in turn brought in Isaac Adams, Jr. Adams, for part ownership of the business, reorganized the Remington shop over two months, utilizing his own patented process. The name of Remington’s company was changed to The Boston Nickel Plating Company, and it stayed in business for more than 100 years. Initially, it was located at 14 Province Street in Boston. In 1876, it was moved to 160 Portland Street.

On June 14, 1869, The United Nickel Company was incorporated in New York by Dr. Adams and a group of investors. Dr. Adams assigned his patents to United for a fee, a certain amount of stock in the company, and a role in top management. The purpose of the company was to exploit and protect the patents of the Adams nickel plating process.

Isaac Adams, Jr. was elected a trustee, as well as the President, Chemist, and patent advisor for United Nickel. For these services, he received a salary and 10% of the company’s stock. In association with United, another nickel-plating job shop was started in New York City called the New York Plating Company. The shop had a larger capacity than the Boston operation. It
was the first shop to use the Wilde dynamo, the earliest successful electric generator used for plating in the United States. Business boomed and the New York plating business had revenues of four thousand to eight thousand dollars per month, which was considered to be a significant cash flow at the time.

In the last quarter of the very productive year of 1869, Adams went to Europe with E. A. Quintard, who was one of the financial backers of United Nickel. With Quintard’s superior business experience, they opened two plants in England, one in Liverpool and the other in Birmingham. Their English financial backer was Alfred Sellers of Sheffield, England. He was also a stockholder of United Nickel.

During that trip, 33-year-old Isaac was able to take some time off to return to France where he finally married the love of his life, Lucille Lods in December 1869. Lucille and her girls stayed in France while Isaac returned to England to attend to the start-up of the English shops.

While he was still in London in February 1870, Isaac filed two more American patents for nickel plating. Then the duo of Adams and Quintard moved on to Paris and opened a plant at Rue St. Andres des Artes. The plant was put under the management of Isaac’s old friend and financial backer, A. Gaiffe, a well-known manufacturer of scientific instruments. Up to this point, there was no nickel-plating competition for Dr. Adams and his partners, and for a time they enjoyed a monopoly in the field.

Isaac and Lucille stayed in France for the next several months as Isaac continued to set up additional European plants in Germany and Austria. In July of 1870, Isaac was engaged in a contract negotiation with the French Army to nickel plate military rifles when the Franco-Prussian War erupted, ending the deal. At this point, Isaac and Lucille decided that it was time to return to the United States where they discovered Annisquam in Gloucester and set up their residence. From this point on, Isaac conducted much of his business from his home by the shore.

NICKEL PLATING BOOM

The global nickel-plating business boomed in the 1870s and kept Isaac busy. He had to deal with the plating shops in Boston and New York. In addition, in January 1872, he set up anoth-
er plating operation in Windham, Connecticut. It was named The Adams Nickel Plating and Manufacturing Company.

One of the major products of this operation was the plating of parts for paper-making machinery. Another was nickel plated screws used for applications where corrosion resistance was critical. Still another aspect of the business that took considerable time for Dr. Adams was his work for United Nickel Company. United defended vigorously its nickel-plating patent positions against all infringers, and there were many. According to Dr. Adams, “We carried on very extensive litigation in ten or twelve different states of the Union, and brought hundreds of suits……We had, all told, first and last, over a thousand licensees . . .”\(^5\)

Maintaining the patent positions was a full-time job for Adams and his colleagues at United Nickel. He said in a letter to a Professor at Bowdoin College, “For the last thirteen years my occupation has been to look after the general interest of the company that I represent as President (United Nickel). Naturally, I have had a great deal to do with the law and today I hardly know whether to call myself a doctor, a chemical expert, or a quasi-lawyer.”\(^6\)

He continued to develop nickel-plating technology over the next several years, but at a much slower rate. Dr. Adams’ tenth and last patent for nickel plating was issued on August 25, 1874. He later received additional patents in other technologies. He patented, sold, and assigned the patent rights for a fee to the Hood Rubber Company. They exploited the Adams rubber patent for the manufacture of rollers used in laundries. Adams even received a patent related to incandescent lamp technology. This development in 1883 was for the use of a lead glass composite in the manufacture of lamps.

TECHNOLOGY DEVELOPMENTS IN THE DOCTOR’S RETIREMENT YEARS

By 1890, the 17-year term limit of Adams’ last nickel-plating patent was coming to an end. As a result, the patent litigation was terminated, and the United Nickel Company was disbanded.
Dr. Adams retired from business. Ever the curious scientist, however, he continued his exploration and experimentation with various technologies.

At the age of 54, he could spend his time on a range of interesting developments. He had workshops in both of his homes where he could build apparatus and conduct his experiments. He became extremely interested in measuring the variations in the earth’s magnetic field. It isn’t clear why, but perhaps, through his interactions with Gloucester fisherman, he learned of the need for more reliable compass readings for navigation on their long voyages to the Grand Banks.

The science community in the early part of the 19th century did not have detailed knowledge or understanding of the composition or dynamics of the earth’s magnetic field. Somewhere along the way, Dr. Adams decided to devote a part of his life to these measurements. In about 1898, he built a magnetic field observatory on his property in Annisquam. To make his observations, he needed a specially designed and built and extremely sensitive magnetometer. Because he enjoyed the challenge, the Doctor decided to make the instrument himself in his Cambridge and Annisquam workshops rather than hiring an expensive contractor.

The Doctor did research on a potential design for his magnetometer at the facilities of Harvard and MIT, which were not far from where he lived in Cambridge. He discovered, for example, that the strength of the earth’s magnetic field could be measured by the oscillations of a compass needle. We know from various communications that he developed a sophisticated instrument that used a highly sensitive galvanometer. The galvanometer measured a sensor output whose magnitude was proportional to the field strength of the earth’s magnetic field. This galvanometer was donated, after the Doctor’s death, to Lehigh University’s physics laboratory where it still resides.

Dr. Adams completed the manufacture of his advanced instrument. Then he built in his backyard a small structure, using copper fasteners, to house the instrument, far from any magnetic mate-
rial in the Annisquam house. Then he undertook a rigorous program to make the magnetic field measurements several times per day. E. H. Davis recalled working with the Doctor to record the information. They stayed up nights together recording the data and computing the logarithmic equivalents of the measurements. The Doctor eventually reported his findings to the U.S. Geodetic Survey.

Dr. Adams also pursued his continuing interest in glass technology. While watching a construction project that was using standard clay bricks, it occurred to him to use glass instead of clay to make the bricks. A glass brick would allow in the ambient light and could be made rather easily into different shapes and sizes. Furthermore, glass provides some sound and thermal insulation as well as fire protection. Dr. Adams used the sand from local beaches in Annisquam to make samples of glass bricks as direct replacements for clay bricks and demonstrated their use in his own Annisquam home.

Once again, Dr. Adams had a development that preceded others’ inventions, but he did not patent it. The extensive use of glass bricks awaited the development of advanced manufacturing technology in Europe. There are many firms offering versions of this product today, especially in Europe.

THE LAST YEARS

While the Doctor kept busy with his experiments, he also enjoyed spending time with his family. By this time his two sons had graduated M.I.T. and settled in Annisquam near their parents. Rayne (an architect) designed and built the two homes at 8 and 3 Adams Hill, presumably for himself, his brother Walter and their wives.
Unlike his father, Doctor Adams seemed to have an excellent relationship with his wife, Lucille. E.H. Davis recalled the special bond between the two:

“She once showed me a pair of his leather slippers which had broken out on the side and she had, with much effort, mended. She said that they could easily have been repaired at a shop, but she knew he would wear them with greater pleasure, knowing she had done them. She was that sort of woman.”  

Lucille died in about 1908. The Doctor was devastated at her loss. Their love had only grown over the years, and the great inventor was never again the same.

The Doctor suffered from serious health problems for the next few years. One issue was termed as asthma. He may have had difficulty in breathing, but it was more likely due to his serious heart condition.

With his increasing age, he was now almost 75 in April 1911, he took a grave fall and injured himself. By mid-May, however, he had recovered enough that he was able to leave Cambridge for Annisquam. He was only able to enjoy a brief period of two months at his seaside Homestead. He died in Annisquam on July 24, 1911. The cause of death was listed as valvular heart disease. His son, Rayne, however, told E.H. Davis that Dr. Adams “died mainly because he did not want to live, he (just) let go.”

Isaac Adams, Jr. was cremated at Mt. Auburn cemetery on July 26th, 1911, and interred at Cambridge Cemetery with his dear wife, Lucille.

By Anthony J. Marolda
ABOUT THE AUTHOR

Anthony J. Marolda is a resident of Annisquam. He owns one of Isaac Adams’ former homes, Cherrycroft, on Adams Hill. He is the author of The Inventor and the Inventor’s Son: The Two Isaac Adams. This biography of Isaac Adams was published in 2007 and is available on Amazon as well as the Cape Ann Museum and The Sandwich Historical Society, New Hampshire.

Endnotes
1 Notes by E.H. Davis on the biography by George Dubpernell of Isaac Adams, Jr., circa 1954, p. 2. Annisquam Historical Society.


6 Notes from the files on Dr. Adams at the George J. Mitchell Department of Special Collections and Archives, Bowdoin College, Brunswick, Maine.

7 Notes by E.H. Davis on the biography by George Dubpernell of Isaac Adams, Jr., circa 1954, Annisquam Historical Society.

8 Ibid.