

**Sir Henry Bessemer  
Inventor & Engineer**

**1813 - 1898**

**http://www2.lucidcafe.com/lucidcafe/gifs/quoteslt.gifI had an immense advantage over many others dealing with  
     the problem inasmuch as I had no fixed ideas derived from long-  
   established practice to control and bias my mind, and did not  
     suffer from the general belief that whatever is, is right.http://www2.lucidcafe.com/lucidcafe/gifs/quotesrt.gif**

**Henry Bessemer** was born on January 19, 1813 in Charlton, Hertfordshire, England. Bessemer developed the first process for mass-producing steel inexpensively. The dominant steel manufacturing technology of today is an extension and refinement of the one developed by Bessemer.  
  
Bessemer, the son of an engineer and typefounder, demonstrated considerable mechanical skill and inventiveness early in life. He made his first fortune selling "gold" powder made from brass as a paint additive. Bessemer's secret formula was used to adorn much of the gilded decoration of his time, and brought him great wealth.  
  
In October, 1855, Bessemer took out a patent for his process of rendering cast iron malleable by the introduction of air into the fluid metal to remove carbon. Bessemer's industrial process was similar to a Chinese method to refine iron into steel, developed in the second century BCE. They called this process the "hundred refinings method" since they repeated the process 100 times.  
  
The story of Bessemer's steel process is a classic example of the military's impetus to technological development. During the Crimean War Bessemer invented a new type of artillery shell. The Generals reported that the cast-iron cannon of the time were not strong enough to deal with the forces of the more powerful shell. Bessemer then developed an improved iron smelting process that produced large quantities of ingots of superior quality. Modern steel is made using technology based on Bessemer's process. Much of the modern industrial age has built upon steel created for cannon of war.  
  
Among the many honors of Bessemer's life were a Knighthood by the British crown for devising a counterfeit-proof official stamp (seal) for the British government, and the Fellowship of the Royal Society. Bessemer died in London on March 14, 1898.

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| The first great invention developed by Edison in Menlo Park was the tin foil phonograph. While working to improve the efficiency of a [telegraph](http://inventors.about.com/library/inventors/bltelegraph.htm) transmitter, he noted that the tape of the machine gave off a noise resembling spoken words when played at a high speed. This caused him to wonder if he could record a telephone message. He began experimenting with the diaphragm of a telephone receiver by attaching a needle to it. He reasoned that the needle could prick paper tape to record a message. His experiments led him to try a stylus on a tinfoil cylinder, which, to his great surprise, played back the short message he recorded, "Mary had a little lamb."  The word phonograph was the trade name for Edison's device, which played cylinders rather than discs. The machine had two needles: one for recording and one for playback. When you spoke into the mouthpiece, the sound vibrations of your voice would be indented onto the cylinder by the recording needle. This cylinder phonograph was the first machine that could record and reproduce sound created a sensation and brought Edison international fame. |
| August 12, 1877, is the date popularly given for Edison's completion of the model for the first phonograph. It is more likely, however, that work on the model was not finished until November or December of that year, since he did not file for the patent until December 24, 1877. He toured the country with the tin foil phonograph, and was invited to the White House to demonstrate it to President Rutherford B. Hayes in April 1878.  In 1878, Thomas Edison established the Edison Speaking Phonograph Company to sell the new machine. He suggested other uses for the phonograph, such as: letter writing and dictation, phonographic books for blind people, a family record (recording family members in their own voices), music boxes and toys, clocks that announce the time, and a connection with the telephone so communications could be recorded.  **Electricity and Lightbulb - History** Replica of original lightbulb - patent # 223,898 Thomas Edison's greatest challenge was the development of a practical incandescent, electric light. Contrary to popular belief, he didn't "invent" the lightbulb, but rather he improved upon a 50-year-old idea. In 1879, using lower current electricity, a small carbonized filament, and an improved vacuum inside the globe, he was able to produce a reliable, long-lasting source of light. The idea of electric lighting was not new, and a number of people had worked on, and even developed forms of electric lighting. But up to that time, nothing had been developed that was remotely practical for home use. Edison's eventual achievement was inventing not just an incandescent electric light, but also an electric lighting system that contained all the elements necessary to make the incandescent light practical, safe, and economical. After one and a half years of work, success was achieved when an incandescent lamp with a filament of carbonized sewing thread burned for thirteen and a half hours.  There are a couple of other interesting things about the invention of the light bulb: While most of the attention was on the discovery of the right kind of filament that would work, Edison actually had to invent a total of seven system elements that were critical to the practical application of electric lights as an alternative to the gas lights that were prevalent in that day.  These were the development of:   1. the parallel circuit, 2. a durable light bulb, 3. an improved dynamo, 4. the underground conductor network, 5. the devices for maintaining constant voltage, 6. safety fuses and insulating materials, and 7. light sockets with on-off switches.   Before Edison could make his millions, every one of these elements had to be invented and then, through careful trial and error, developed into practical, reproducible components. The first public demonstration of the Thomas Edison's incandescent lighting system was in December 1879, when the Menlo Park laboratory complex was electrically lighted. Edison spent the next several years creating the electric industry.  The modern electric utility industry began in the 1880s. It evolved from gas and electric carbon-arc commercial and street lighting systems. On September 4, 1882, the first commercial power station, located on Pearl Street in lower Manhattan, went into operation providing light and electricity power to customers in a one square mile area; the electric age had begun. Thomas Edison's Pearl Street electricity generating station introduced four key elements of a modern electric utility system. It featured reliable central generation, efficient distribution, a successful end use (in 1882, the light bulb), and a competitive price. A model of efficiency for its time, Pearl Street used one-third the fuel of its predecessors, burning about 10 pounds of coal per kilowatt hour, a "heat rate" equivalent of about 138,000 Btu per kilowatt hour. Initially the Pearl Street utility served 59 customers for about 24 cents per kilowatt hour. In the late 1880s, power demand for electric motors brought the industry from mainly nighttime lighting to 24-hour service and dramatically raised electricity demand for transportation and industry needs. By the end of the 1880s, small central stations dotted many U.S. cities; each was limited to a few blocks area because of transmission inefficiencies of direct current (dc).  The success of his electric light brought Thomas Edison to new heights of fame and wealth, as electricity spread around the world. His various electric companies continued to grow until in 1889 they were brought together to form Edison General Electric. Despite the use of Edison in the company title however, he never controlled this company. The tremendous amount of capital needed to develop the incandescent lighting industry had necessitated the involvement of investment bankers such as J.P. Morgan. When Edison General Electric merged with its leading competitor Thompson-Houston in 1892, Edison was dropped from the name, and the company became simply General Electric.  **Edison Motion Pictures - History** Kinetoscope - Motion Pictures Projector Thomas Edison's interest in motion pictures began before 1888, however, the visit of [Eadweard Muybridge](http://inventors.about.com/od/mstartinventors/a/Muybridge.htm) to his laboratory in West Orange in February of that year certainly stimulated his resolve to invent a camera for motion pictures. Muybridge proposed that they collaborate and combine the Zoopraxiscope with the Edison phonograph. Although apparently intrigued, Edison decided not to participate in such a partnership, perhaps realizing that the Zoopraxiscope was not a very practical or efficient way of recording motion. In an attempt to protect his future, he filed a caveat with the Patents Office on October 17, 1888, describing his ideas for a device which would "do for the eye what the phonograph does for the ear" -- record and reproduce objects in motion. He called it a "[Kinetoscope](http://inventors.about.com/library/inventors/bledison_kinetoscope2.htm)," using the Greek words "kineto" meaning "movement" and "scopos" meaning "to watch."  One of Edison's first motion picture and the first motion picture ever copyrighted showed his employee Fred Ott pretending to sneeze. One problem was that a good film for motion pictures was not available. In 1893, Eastman Kodak began supplying motion picture film stock, making it possible for Edison to step up the production of new motion pictures. He built a motion picture production studio in New Jersey. The studio had a roof that could be opened to let in daylight, and the entire building was constructed so that it could be moved to stay in line with the sun.  C. Francis Jenkins and Thomas Armat invented a film projector called the Vitascope and asked Edison to supply the films and manufacture the projector under his name. Eventually, the Edison Company developed its own projector, known as the Projectoscope, and stopped marketing the Vitascope. The first motion pictures shown in a "movie theater" in America were presented to audiences on April 23, 1896, in New York City. |

Elias Howe was the inventor of the first American-patented sewing machine.

Elias Howe was born in Spencer, Massachusetts on July 9, 1819. After he lost his factory job in the Panic of 1837, Howe moved from Spencer to Boston, where he found work in a machinist's shop. It was there that Elias Howe began tinkering with the idea of inventing a mechanical [sewing machine](http://inventors.about.com/od/sstartinventions/a/sewing_machine.htm).

**Elias Howe - Lockstitch Sewing Machine**

Eight years later, Elias Howe demonstrated his machine to the public. At 250 stitches a minute, his lockstitch mechanism outstitched the output of five hand sewers with a reputation for speed. Elias Howe patented his lockstitch sewing machine on September 10, 1846 in New Hartford, Connecticut.

**Elias Howe - Competition & Patent Struggles**

For the next nine years Howe struggled, first to enlist interest in his machine, then to protect his patent from imitators who refused to pay Howe royalties for using his designs. His lockstitch mechanism was adopted by others who were developing sewing machines of their own.

During this period, Isaac Singer invented the up-and-down motion mechanism, and Allen Wilson developed a rotary hook shuttle. Howe fought a [legal battle](http://inventors.about.com/od/sstartinventions/a/sewing_machine_2.htm) against other inventors for his patent rights and won his suit in 1856.

**Profits**

After successfully defending his right to a share in the profits of other sewing machine manufacturers, Howe saw his annual income jump from three hundred to more than two hundred thousand dollars a year. Between 1854 and 1867, Howe earned close to two million dollars from his invention. During the Civil War, he donated a portion of his wealth to equip an infantry regiment for the Union Army and served in the regiment as a private.

# Jan Ernst Matzeliger

## "Now Everyone Can Afford Decent Shoes."

### http://www.users.fast.net/~blc/matzel.gifhttp://www.users.fast.net/~blc/matzedwg.gifAutomatic shoe lasting machine. Jan Ernst Matzeliger (1852-1889) was born in Paramaribo, Surinam (Dutch Guiana), South America. His father was a Dutch engineer who married a native Black Surinamese woman. At the age of ten, young Jan worked in the machine shops supervised by his father, where his talents and mechanical aptitude was nurtured. In 1871, at the age of 19, he sailed the world and settled in Philadelphia 2 years later.

#### Hearing about the rapid growth of the shoe industry in Massachusetts, Matzeliger went to Lynn in 1877 in search of a better job. Since he seas a Black foreigner who spoke very little English. he had trouble finding employment. A determined young man, he quickly learned the English language.

#### He eventually landed a job as an apprentice in a shoe factory operating various shoe making machinery during time when most white people would look down on him because of his Black ancestry, he did manage to make a few friends in town. He was a devout Christian, teaching Sunday School at The North Congregational Church, one of the few churches in the area that would accept Blacks.

#### In the early days of shoe making, shoes were made mainly by hand. For proper fit, the customer's feet had to be duplicated in size and form by creating a stone or wooden mold called a "last" from which the shoes were sized and shaped. Since the greatest difficulty in shoe making was the actual assembly of the soles to the upper shoe, it required great skill to tack and sew the two components together. It was thought that such intricate work could only be done by skilled human hands. As a result, shoe lasters held great power over the shoe industry. They would hold work stop-pages without regard for their fellow workers' desires, resulting in long periods of unemployment for them.

#### Matzelinger set out to try to solve the problem of this strangle-hold by developing an automatic method for lasting shoes. It took many years and much sacrifice before he came up with a prototype that was successful. Matzeliger's machine was able to turn out from 150 to 700 pairs of shoes a day versus an expert hand lasters fifty.

#### By 1889 the demand of the shoe lasting machine was overwhelming. A company was formed, The Consolidated Lasting Machine Company, where Matzelinger was given huge blocks of stock for his invention. His machine had revolutionized the entire shoe industry in the U.S . and around the world.

#### Unfortunately, Jan Matzelinger didn't live to see the fruits of his labor. Because he had sacrificed his health working exhausting hours on his invention and not eating over long periods of time, he caught a cold which quickly developed into tuberculosis. He died at age 37 on August 24, 1887.

#### Jan Ernst Matzeliger's invention was perhaps "the most important invention for New England." His invention was "the greatest forward step in the shoe industry," according to the church bulletin of The First Church of Christ (the same church that took him as a member) as part of a commemoration held in 1967 in his honor. Yet, because of the color of his skin, he was not mentioned in the history books until recently.

**saac Merritt Singer**  
Born: October 27, 1811 - Pittstown, New York,   
Died: July 23, 1875 - Devon, England

**Singer Sewing Machines**

Quiltmakers remember Isaac M. Singer as the developer of the Singer sewing machine, but before making improvements to the sewing machine designs of his era, Singer was an actor, and also patented other types of machinery, including rock drilling equipment.

**American Lockstitch Sewing Machines**

Walter Hunt is thought to be the first American to develop a sewing machine that produced a lockstitch, but didn't patent his 1932 invention. Twelve years later, in 1846, Elias Howe was awarded a U.S. patent for developing a sewing machine capable of producing a lockstitch from two threads. The machines were similar -- both used needles with eyes at the bottom end, rather than at the top, which had been the norm. Fabric was fed horizontally through Hunt's sewing machine, vertically through Elias Howe's.

Hunt had evidently lost interest in his machine, and Elias Howe couldn't find buyers or investors. Each of Howe's machine took a few months to build and the price was out of reach for most families. Howe's sewing machines were also difficult to use.

Isaac Singer developed his version of a lockstitch sewing machine in 1850, improving the design of a Lerow & Blodgett model. Singer's machine could sew 900 stitches per minute (versus the 250 of Howe's sewing machine). Other companies wasted no time in joining the blossoming sewing machine market. In 1851, Singer received a patent for his modifications, which included a presser foot and an improved shuttle (for the second thread). Singer's design was the first sewing machine to sew a continuous, reliable straight or curved seam.

Elias Howe was in England while the U.S sewing machine business heated up. When he returned to America, Howe filed suit against manufacturers he felt were infringing on his patent, including Isaac Singer. Some lawsuits were settled out of court, but his pursuit of Singer went to to the U.S. Supreme Court, which ruled in Howe's favor, awarding him a lump sum on past sales and royalties for future sales.

**Singer's Focus on the Home Sewing Market**

Issac Singer's early machines were pricey, selling for $100 each. While they cost less than Howe's $300 sewing machines, they were still beyond the budget of most American families. Singer began to mass produce his product, refining the design to make the machines less clumsy than the earliest model. The end result was a sewing machine that sold for half as much as the original.

Singer's work as an actor prepared him to become a showman -- he was a personable guy who seemed to be a born salesman. He built elaborate showrooms for his sewing machines, and developed a worldwide network that sold parts, made repairs and offered training. The Singer Company arranged installment payments for machines and accepted trade-ins, making its products affordable to people who possibly only dreamed of owning a sewing machine.

By 1890, fifteen years after Isaac's death, Singer machines made up 90% of the world's sewing machine sales. In 1933, Singer introduced its [Featherweight sewing machine](http://quilting.about.com/od/essentialtoolssupplies/ig/Singer-Featherweight-Gallery/) at the Chicago World's Fair. The little machines remained in production for more than three decades, and are extremely popular with today's quilters.

In 1939, the company temporarily halted the development of sewing machines in order to produce war-time supplies. In 1975, Singer introduced the world's first electronic sewing machine. The company has had its ups and downs in recent years, but seems to be gaining in momentum again, and remains a more affordable choice for home sewers than many other brands.

**Isaac Singer's Personal Life**

I really hadn't thought much about the personal life of Isaac Singer until searching for [photographs of early sewing machines](http://quilting.about.com/od/vintagesewingmachines/ig/Sewing-in-Women-s-History/). Singer fathered (at least) 22 children during his life, two with his first wife, Catharine Maria Haley. While still married to Catharine, Singer proposed to Mary Ann Sponsler, and although the pair were never legally married, the union produced eight children (some accounts say ten). Singer was granted a divorce from Catharine -- based on *her* adultery with another man.

Singer had five more children with a company employee before Mary Ann discovered the new relationship -- it must have been easy to keep 'extra' families separate in those days, especially when a person was wealthy. Later, Singer had more children with a woman he'd become acquainted with in Paris.

In all, Isaac M. Singer listed 22 children in his will, but two others possibly died at a young age.

Born in Columbus, Ohio, in April 23, 1856, Granville T Woods dedicated his life to developing a variety of inventions relating to the railroad industry.

**The Black Edison**

To some he was known as the "Black Edison, both great inventors of their time. Granville T Woods invented more than a dozen devices to improve electric railway cars and many more for controlling the flow of electricity. His most noted invention was a system for letting the engineer of a train know how close his train was to others. This device helped cut down accidents and collisions between trains.

**Granville T Woods - Self-Education**

Granville T Woods literally learned his skills on the job. Attending school in Columbus until age 10, he served an apprenticeship in a machine shop and learned the trades of machinist and blacksmith. During his youth he also went to night school and took private lessons. Although he had to leave formal school at age ten, Granville T Woods realized that learning and education were essential to developing critical skills that would allow him to express his creativity with machinery.

In 1872, Granville T Woods obtained a job as a fireman on the Danville and Southern railroad in Missouri, eventually becoming an engineer. He invested his spare time in studying electronics. In 1874, he moved to Springfield, Illinois, and worked in a rolling mill. In 1878, he took a job aboard the Ironsides, a British steamer, and, within two years, became Chief Engineer of the steamer. Finally, his travels and experiences led him to settle in Cincinnati, Ohio, where he became a person dedicated to modernizing the railroad.

**Granville T Woods - Love of the Railroad**

In 1888, Granville T Woods developed a system for overhead electric conducting lines for railroads, which aided in the development of the overhead railroad system found in cities such as Chicago, St. Louis, and New York City. In his early thirties, he became interested in thermal power and steam-driven engines. In 1889, he filed his first patent for an improved [steam-boiler furnace](http://inventors.about.com/od/blackinventors/ss/Granville_Woods.htm). In 1892, a complete Electric Railway System was operated at Coney Island, NY. In 1887, he patented the [Synchronous Multiplex Railway Telegraph](http://inventors.about.com/od/blackinventors/ss/Granville_Woods_2.htm), which allowed communications between train stations from moving trains. Granville T Woods' invention made it possible for trains to communicate with the station and with other trains so they knew exactly where they were at all times.

[Alexander Graham Bell's](http://inventors.about.com/od/bstartinventors/a/telephone.htm) company purchased the rights to Granville T Woods' telegraphony patent enabling him to become a full-time inventor. Among his other top inventions were a steam boiler furnace and an automatic air brake used to slow or stop trains. Wood's electric car was powered by overhead wires. It was the third rail system to keep cars running on the right track.

A typewriter by definition is a small machine, either electric or manual, with type keys that produced characters one at a time on a piece of paper inserted around a roller. Typewriters have been largely replaced by personal computers and home printers.

**Christopher Sholes**

Christopher Sholes was an American mechanical engineer, born on February 14, 1819 in Mooresburg, Pennsylvania, and died on February 17, 1890 in Milwaukee, Wisconsin. He invented the first practical modern typewriter in 1866, with the financial and technical support of his business partners Samuel Soule and Carlos Glidden. Five years, dozens of experiments, and two patents later, Sholes and his associates produced an improved model similar to today's typewriters.

**QWERTY**

The Sholes typewriter had a type-bar system and the universal keyboard was the machine's novelty, however, the keys jammed easily. To solve the jamming problem, another business associate, James Densmore, suggested splitting up keys for letters commonly used together to slow down typing. This became today's standard "QWERTY" keyboard.

**Remington Arms Company**

### Christopher Sholes lacked the patience required to market a new product and decided to sell the rights to the typewriter to James Densmore. He, in turn, convinced Philo Remington (the [rifle](http://inventors.about.com/od/militaryhistoryinventions/a/firearms.htm) manufacturer) to market the device. The first "Sholes & Glidden Typewriter" was offered for sale in 1874 but was not an instant success. A few years later, improvements made by Remington engineers gave the typewriter machine its market appeal and sales skyrocketed.

Margaret Knight was an employee in a paper bag factory when she invented a new machine part that would automatically fold and glue paper bags to create square bottoms for paper bags. Paper bags had been more like envelopes before. Workmen reportedly refused her advice when first installing the equipment because they mistakenly thought, "what does a woman know about machines?" Margaret Knight can be considered the mother of the grocery bag, she founded the Eastern Paper Bag Company in 1870.

Margaret Knight (Mattie) was born in 1838. She received her first patent at the age of 30, but inventing was always part of her life. Margaret or ‘Mattie’ as she was called in her childhood, made sleds and kites for her brothers while growing up in Maine. When she was just 12 years old, she had an idea for a stop-motion device that could be used in textile mills to shut down machinery, preventing workers from being injured.

Margaret Knight is considered one of "the female Edison," and received some 26 patents for such diverse items as a window frame and sash, machinery for cutting shoe soles, and improvements to internal combustion engines. Margaret Knight's paper bag machine made flat-bottomed paper bags that are still in use to this very day!

A few of Margaret Knight's other inventions:

 dress and skirt shield  - 1883

 clasp for robes  - 1884

 spit - 1885

 numbering machine - 1894

 window frame and sash - 1894

 rotary engine - 1902

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| In 1876, at the age of 29, Alexander Graham Bell invented his [telephone](http://inventors.about.com/library/inventors/bltelephone1.htm). In 1877, he formed the Bell Telephone Company, and in the same year married Mabel Hubbard and embarked on a yearlong honeymoon in Europe.  Alexander Graham Bell might easily have been content with the success of his telephone invention. His many laboratory notebooks demonstrate, however, that he was driven by a genuine and rare intellectual curiosity that kept him regularly searching, striving, and wanting always to learn and to create. He would continue to test out new ideas through a long and productive life. He would explore the realm of communications as well as engage in a great variety of scientific activities involving kites, airplanes, tetrahedral structures, sheep-breeding, artificial respiration, desalinization and water distillation, and hydrofoils. |
| Alexander Melville Bell with his wife, Eliza Grace Symonds and their children, Melville James, Alexander Graham and Edward CharlesWith the enormous technical and later financial success of his telephone invention, Alexander Graham Bell's future was secure, and he was able to arrange his life so that he could devote himself to his scientific interests. Toward this end, in 1881, he used the $10,000 award for winning France's Volta Prize to set up the Volta Laboratory in Washington, D.C. A believer in scientific teamwork, Bell worked with two associates, his cousin Chichester Bell and Charles Sumner Tainter, at the Volta Laboratory. Their experiments soon produced such major improvements in Thomas Edison's phonograph that it became commercially viable. After 1885, when he first visited Nova Scotia, Bell set up another laboratory there at his estate, Beinn Bhreagh (pronounced Ben Vreeah), near Baddeck, where he would assemble other teams of bright young engineers to pursue new and exciting ideas.  Among one of his first innovations after the telephone was the "[photophone](http://inventors.about.com/library/inventors/bltelephone3.htm)," a device that enabled sound to be transmitted on a beam of light. Bell and his assistant, Charles Sumner Tainter, developed the photophone using a sensitive selenium crystal and a mirror that would vibrate in response to a sound. In 1881, they successfully sent a photophone message over 200 yards from one building to another. Bell regarded the photophone as "the greatest invention I have ever made; greater than the telephone." Alexander Graham Bell's invention reveals the principle upon which today's [laser](http://inventors.about.com/library/inventors/bllaser.htm) and [fiber optic](http://inventors.about.com/library/inventors/blfiberoptics.htm) communication systems are founded, though it would take the development of several modern technologies to realize it fully.   |  | | --- | | Alexander Graham Bell Invention Sketch  **Alexander Graham Bell** **Sketch of a vacuum jacket in use.** |   Over the years, Alexander Graham Bell's curiosity would lead him to speculate on the nature of heredity, first among the deaf and later with sheep born with genetic irregularities. His sheep-breeding experiments at Beinn Bhreagh sought to increase the numbers of twin and triplet births. Bell was also willing to attempt inventing under the pressure of daily events, and in 1881 he hastily constructed an electromagnetic device called an induction balance to try and locate a bullet lodged in President Garfield after an assassin had shot him. He later improved this and produced a device called a telephone probe, which would make a telephone receiver click when it touched metal. That same year, Bell's newborn son, Edward, died from respiratory problems, and Bell responded to that tragedy by designing a metal vacuum jacket that would facilitate breathing. This apparatus was a forerunner of the iron lung used in the 1950s to aid polio victims. In addition to inventing the audiometer to detect minor hearing problems and conducting experiments with what today are called energy recycling and alternative fuels, Bell also worked on methods of removing salt from seawater.   |  | | --- | | Alexander Graham Bell - Silver Dart  **Photograph of the**  **Silver Dart** |   However, these interests may be considered minor activities compared to the time and effort he put into the challenge of flight. By the 1890s, Bell had begun experimenting with propellers and kites. His work led him to apply the concept of the tetrahedron (a solid figure with four triangular faces) to kite design as well as to create a new form of architecture. In 1907, four years after the [Wright Brothers](http://inventors.about.com/library/inventors/bl_wright_brothers.htm) first flew at Kitty Hawk, Bell formed the Aerial Experiment Association with Glenn Curtiss, William "Casey" Baldwin, Thomas Selfridge, and J.A.D. McCurdy, four young engineers whose common goal was to create airborne vehicles. By 1909, the group had produced four powered aircraft, the best of which, the *Silver Dart,* made the first successful powered flight in Canada on February 23, 1909. Bell spent the last decade of his life improving hydrofoil designs, and in 1919 he and Casey Baldwin built a hydrofoil that set a world water-speed record that was not broken until 1963. Months before he died, Bell told a reporter, "There cannot be mental atrophy in any person who continues to observe, to remember what he observes, and to seek answers for his unceasing hows and whys about things. |