

Classic Boat



*Alexander Graham Bell
(1847-1922) the Boat Builder*

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ALEXANDER GRAHAM BELL

(1847-1922) *the boat builder*



Without Alexander Graham Bell, there might not have been a Steve Jobs! What has had a bigger impact on the way we live, the telephone or the smart phone? Because it happened so long ago - like 135 years ago - we tend to take the invention of the basic telephone for granted. However, we could not have had one without the other.

Bell invented the phone at 29 and developed many other important inventions before he died at the age of 75. Jobs started Apple Corp. at 21 and gave the world the Mac, iPod, iPad, and iPhone before he died prematurely at 56; we will never know what else Jobs might have accomplished if he had lived as long as Bell.

Bell's telephone fame should not be allowed to overshadow all the amazing things he accomplished in his lifetime, including boats. If we had one (and we should), we should elect him to the innovation section of our 'Boat Builders' Hall of Fame'. In order to fully appreciate Bell's accomplishments on water in his late 60s, one has to know about his background, what he achieved at an early age, and how he went about his various inventions. His tenacity, independent thinking, practise of working with others, and addiction to detail that were integral to his success with the telephone were all critical to his achievements on the water. His story is fascinating, and I can assure you the version offered here is very highly condensed. And while he was never officially a Canadian citizen, there are many significant aspects of his story that took place in Canada.

I think the comparison is interesting because both were geniuses in their time and telephone developers. Together they had more impact on the way humans interact with one another than anyone in the history of civilization. However, while Jobs was also a very capable businessman, part of whose legacy is one of the most valuable companies in the world, Bell was clearly a serial inventor who left the company building to others. Bell's legacy is a long list of inventions and accomplishments in many different areas or industries including the photophone (sound over a beam of light) and the first wax recording cylinder (which led to the phonographic record). He invented a metal detector to try to locate an assassin's bullet located in US President Garfield in 1881. He was also a co-founder of the *National Geographic Magazine* and its first President, as well as founder of *The Journal of Science*.

Great discoveries and improvements inevitably involve the cooperation of many minds:
Alexander Graham Bell

This article is about Alexander Graham Bell the watercraft innovator/designer/builder and why what he, along with Casey Baldwin, accomplished in this field should be recognized as a very important and significant part of our small boat history. It's also about how *Tolka*, the ACBS 2012 Poster Boat, came to be produced by Alexander Graham Bell Laboratories.

The Telephone Period

Alexander Graham Bell was born in Edinburgh, Scotland in 1847. He attended the universities of Edinburgh and London and studied elocution. He was very curious as a child and there are a numerous examples of his experimenting and inventing things as random as a corn dehusker at age 10, which indicated how he would spend the rest of his life. He began working on the idea of transmitting speech at

the age of 18, likely being influenced by his grandfather's and father's work with deaf people and the fact that his mother was growing deaf. He had to find a solution to this health problem that was quite prevalent at the time. He became very proficient at sign language and symbols as it was very much a part of his pursuit of new ways of communication. It was in 1874 at 27, while he was trying to send multiple messages down one telegraph line, that he came up with the basic ideas for the telephone, and it would be two years later that the first complete sentence was transmitted telephonically.

MILESTONES

1847 Born in Scotland	1859 age 12 invents a corn de-husker	1863 age 16 teaching elocution and piano	1865 age 18 starts pursuing voice transmission	1870 age 23 migrates to Canada	1872 age 25 founded a school for the deaf in Boston	1876 age 29 invented the telephone	1877 age 30 formed Bell Telephone	1877 age 30 married Mabel Hubbard	1880 age 33 invented the photophone
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Photo credit:
Dr. Gilbert H. Grosvenor/National Geographic stock

Bell and his wife Mabel discussing hydrofoil test results. Mabel was one of his most trusted and practical advisors. Mabel also managed Beinn Bhreagh, the mansion that was home for many of Bell's collaborators and important visitors.

Bell's work took place in the United Kingdom, Canada, and the United States. In 1870 when he was 23, Bell's parents moved to Canada to benefit Alexander's health and settled on a 10 acre farm in Brantford, Ontario. Bell set up a workshop and continued his study of the human voice. He learned the Mohawk language from the nearby Six Nations Reserve and translated its unwritten vocabulary into visible speech symbols; as a result he was made an honorary chief. He and his father made plans to set up a teaching practice for the deaf in Montreal. This led to invitations to bring the System of Visible Speech to schools in Boston and Hartford, Connecticut as well as Northampton, Massachusetts that his father insisted he undertake. One year later Alexander Bell opened a private practice in Boston with 30 students in his first class.

During this period, Bell taught during the day, pursued his experiments with sound transfer at night, and almost ran himself into the ground. He spent his summers in Brantford experimenting in his workshop. In 1873 he decided to give up his lucrative teaching practice and focus on his experiments with transmitting sound. He kept two students, one of whom, Mabel Hubbard, had lost her hearing as a result of scarlet fever at age 5; she eventually became his wife. It was a very

significant development, because Gardiner Hubbard, Mabel's father provided the financial backing for some of Bell's business ventures in later years, including the telephone.

In 1874, the telegraph was taking hold and in the words of the President of Western Union it had become "the nervous system of commerce." The next challenge was to send multiple messages at the same time to avoid building new lines. Bell thought he had a way to do it, and Gardiner Hubbard agreed to underwrite the pursuit. In 1875 Bell developed an acoustic telegraph and patent application that was filed on February 14, 1876 *just two hours* before a competitor who had developed a similar invention. He continued to refine his telephone, and in August of that year in Brantford he transmitted voice clearly over a distance of five miles giving Canada its piece of telephone fame. The Bell Telephone Company was formed in 1877, and in less than 10 years over 150,000 people in the US owned telephones. One remarkable thing is Bell got married a few days after incorporating the company and his wedding present to his wife was 99% of his shares of the Bell Telephone Company. She in turn gave her father power of attorney for her shares, and he then had effective control of the company. Gardiner Hubbard made a series of acquisitions and consolidated everything into American Telephone and Telegraph (AT&T). Bell Telephone still exists in Canada. As a tribute to Bell after he died, all phones in North America, which numbered in the millions, went silent for one minute. 



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Bell Family Photo ca. 1885 — Alexander and Mabel had four children including Elsie and Marian pictured here and two sons who died in infancy. Bell built a 57 foot sailboat named after his daughter Elsie that is still sailing on Bras d'Or Lake in Baddeck, Nova Scotia, Canada.

1881 age 34 invented the metal detector	1883 age 36 founded the Journal of Science	1885 age 38 formed AT&T transmission network	1886 age 39-invented wax recording cylinder	1896 age 49 co-founder National Geo- graphic Society	1908 age 61-begins experimenting with hydrofoils	1909 age 62-first air flight in Can & UK	1913 age 66-first Bell-Baldwin self propelled hydrofoil	1919 age 72-world water speed record -HD	1922 age 75-died in Nova Scotia
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Photo credit:
Bell Collection/National Geographic stock

Beinn Bhreagh (gaelic: beautiful mountain) in Baddeck was a collection of buildings dominated by an elegant mansion that was a family home and nerve centre for all of Bell's experiments. It was managed by Mabel and frequently accommodated world famous people and the collaborators for many of Bell's experiments.

Alexander Graham Bell Laboratories

In 1885 the Bells began building a summer home at Baddeck on Cape Breton Island, Nova Scotia that eventually became a large complex known as *Beinn Bhreagh* (Gaelic: beautiful mountain). Bell selected this location because it so reminded him of Scotland. It included a large laboratory which became known as Alexander Graham Bell Laboratories. After the telephone invention, the Bell family moved from Boston to Washington to be near the courts, and Bell spent the next 20 years successfully defending his patent(s) against hundreds of challenges on virtually a daily basis. Over the next 30 years Bell and his family alternated between Washington and Baddeck, but Bell spent more and more of his time in Nova Scotia absorbed in his experiments.

Kites, planes, and boats were invented, developed, and researched at Bell Laboratories over a 30-40 year period. Bell was invariably ahead of his time or in direct competition with the best inventors of the world. It is not documented, but it appears Bell Laboratories was not run as a typical for-profit business but was made possible from the wealth created by Bell's invention of the telephone. Bell had the opportunity to experiment with the ideas that he was routinely developing, refining, and trialing without regard to cost. One of the most significant events after 1900 was the recruitment of Casey Baldwin, a graduating engineer from the University of Toronto who became a working partner of Bell's and a virtual extension of himself. Bell and Baldwin worked very closely together on everything and had complimentary skill sets. After Bell died in 1922, Casey Baldwin directed the continuation of Bell Laboratories until he entered politics in 1933.

Another important aspect of this period is that Mabel Bell, who was deaf from the age of 5, was the administrator for the family, in charge of the family and Laboratory finances and a participant in many technical discussions. She enabled Bell to dream and experiment all the time and was a significant source of encouragement and advice. She was in effect a working partner of Bell and a constant companion. She

was a remarkable woman, and outside of Bell Laboratories, she was a serious women's rights advocate and founder of the Montessori Education Association, opening the first Montessori School in Canada in 1912. Mabel was ten years younger than Bell but only survived him by five months. She is a huge and relatively unknown part of the Alexander Graham Bell story.



Photo credit:
Bell Collection/National Geographic stock

HD-4 out of water on a marine rail showing her elaborate under water foil structure. She was a huge craft of 60 feet in length and weighing 10,000 lbs.

Dynamic Transportation Period

The early 1900s was such a very dynamic period! So many mechanical things were created then for which we only have refinements today. I think it's comparable to the space exploration and computer development periods that occurred later in the 20th century. It was especially true for all modes of transportation including the automobile, the airplane, and boat. It is very interesting to look at each development and invention in the context of what else was going on and how much interdependence there was. There was tremendous progress with engines of all types that led to power options for automobiles, airplanes and boats and even outboard motors. And then there was the energy brought to bear on all development by World War I. Things just had to get done in record time because national security was at stake. I believe these events combined to create a momentum in innovation that continued for years.



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Silver Dart. This was the first plane to fly in the British Empire on Feb. 23, 1909. Built by the Ariel Experimental Association it was competitive with the Wright Bros but did not get the same attention. It inspired Bell to form the first airplane manufacturing company in Canada.



Heavier than Air Aircraft Period

In 1891, at 44, Bell began to experiment with heavier than air aircraft. He started with unmanned and manned box kites. After quite a bit of success on his own, in 1906 after recruiting Baldwin, he then subsequently attracted Douglas McCurdy, Thomas Selfridge and I Glenn Curtis, a designer of combustion engines. Together they formed a scientific team that was incorporated as the Aerial Experimental Association (AEA). Mabel provided all the financing and in the next year and a half they built a number of experimental aircraft and were on the leading edge of aviation development. Bell acted as the mentor for the younger men and insisted on detailed record keeping of successes and failures. Their work culminated in the first fixed wing flight in Canada and United Kingdom when the Silver Dart took off from a frozen Bras d'Or (main lake at Baddeck) in February 1909. Shortly after that Bell supplied the facility and capital for the Canadian Aerodrome Company, the first airplane manufacturer in Canada.

Alexander Graham Bell and his associates, were one of several pioneer groups and individuals in aviation around 1900-1911 building the first airplanes. All of these inventors were in competition to succeed and progressed through the development of kites, then planes, and overcame the many barriers to fly with ingenuity and incredible amounts of trial and error experimentation. They absorbed and incorporated the progress of other inventors without the existence of Google or computer assisted programs to accelerate their developments. No one would have believed at the time that just a few short years later the airplane would play such an important role in World War I.



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Bell sitting in the cockpit of HD-4 with his grandson and Casey Baldwin his partner is standing beside. Baldwin worked on air and water craft experiments with Bell and carried on the boat building till 1933 after Bell died in 1922.

Boat Building at Bell Laboratories

So after getting planes to fly, Bell moved on to facilitate the planes landing on water and that led to developing a hydrofoil boat. He and his partner Casey Baldwin pursued that development just like all the ones before it with meticulous calculation and years of trial and error. He always had a big vision just as he did with the telephone.

Bell's 'experimental watercraft era' began following an article in *Scientific American* that explained the basic principles

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Bell employed as many as 40 people building his experimental air and water craft as well as traditional launches, sail boats and row boats for both his own and third-party use.

of hydrofoils and hydroplanes. Bell and Baldwin began experimenting with hydrofoils as an aid to airplanes taking off from water. In 1910-11 they visited with Italian inventor Enrico Forlanini and rode in his experimental hydrofoil boat on Lake Maggiore in Italy. When they returned to Baddeck, they started building a number of 'proof of concept' structures including the *Dhonnas Beag*, the first Bell-Baldwin self-propelled hydrofoil in 1913. After that they were called hydrodromes or HD with a number to indicate the version.

In 1913 Bell hired Walter Pinaud, a Sydney, Nova Scotia yacht designer, to do some design work. Pinaud subsequently took over the boatyard at Bell Laboratories at Beinn Bhreagh. HD-4, powered by Renault engines, achieved 54 mph with rapid acceleration and good stability. HD-4 evolved, and following the First World War, the US Navy enabled Bell to acquire two 350 hp Liberty Aircraft engines in July 1919. On September 9, 1919 the HD-4 set a world marine speed record of 70.86 mph, a record that stood for 10 years. Lots of mono displacement hulled boats were running the same Liberties, but were only achieving speed of 42-44 mph. So Bell was well ahead of his time again. Baldwin apparently considered building a boat to compete at Harmsworth, but that did not happen until later.

During his airplane and boat building period, Bell was in touch with governments and their military organizations in Canada, the United States, and the United Kingdom. He had tremendous connections and respect because of his telephone fame, so he was able to attract delegations from all three to his out-of-the-way location in Baddeck, Nova Scotia for demonstrations. He tried to build airplanes and hydrodromes for navy target practice with the hope of securing a large contract(s). His lack of commercial success, of course, never deterred him from pressing on with his next new idea or innovation.

In 1916 Bell formed *Bell Baldwin Hydrodromes* and started filing patents. Casey Baldwin introduced Bell to Col Lash, a

patent lawyer in Toronto who would later become Casey's brother-in-law, to form the company. Lash became the President because neither Bell nor Baldwin was a capable businessman.

In an effort to sustain his workforce, Bell started building small boats for the Canadian Government during WWI. He also built several large houseboats for personal use as well as boats for his wife. There was always a need to have various tenders to support the ongoing experiments that took place on Bras D'Or. Probably because of Casey Baldwin's passion for sailing, a number of sailboats were built, with *Elsie* likely the most famous. It was a 57' yawl built for Bell's daughter that is still sailing today.

Bell Laboratories was a very unusual boatyard because it built traditional boats and experimental craft without having to struggle to make a profit like every other boat builder at that time. There is no record of how many traditional boats were built, but there are thousands of detailed records about all the experimental watercraft that were trialed by Bell during his lifetime.

Bell Laboratories after Bell Died

After Bell died in 1922, Casey Baldwin inherited the mansion, Beinn Bhreagh, along with all the laboratory facilities and carried on the boat building activities with the leading edge type development for which Bell was famous. He continued to research the Hydrodrome design for all lengths in an effort to secure government contracts. He built other custom ordered boats. He was always interested in the Harmsworth races and in 1928 secured a contract with Mary Carstairs to build a 30' race boat that utilized a hydrodrome design with 650 hp and was capable of going 115 mph. She withdrew from the race before the boat was finished, so it never raced. It was finished the following year with a 220 hp Hispano Susa and went 57 mph.

Tolka Built by Bell Laboratories

It was in 1927 that Baldwin's brother-in-law, John Lash, asked him to build a boat for the family to use on Lake Muskoka. In 1928 a water limousine called *Tolka* was delivered to Muskoka. She was a 36' state-of-the-art design with hard chine and capable of 40 mph. She also had the latest Sterling Petrol engine and a unique-at-the-time dual control system enabling the boat to be driven from forward and aft positions. It was a wonderful example of the capabilities of the boatyard and the local craftsmen. In its exquisitely restored form, *Tolka* is a wonderful historic boat that celebrates the history and success of Alexander Graham Bell, Mabel Bell, and Casey Baldwin. *Tolka* will be the featured boat at the ACBS show in Gravenhurst on July 7, 2012.

Alexander Graham Bell was an incredible genius in his time just like Steve Jobs was. Neither man did it alone but rather with some very crucial and important enablers. In Bell's case the team included, among others, his wife Mabel, Mabel's father Gardiner Hubbard, and Casey Baldwin. His legacy is huge and worthy of regular celebration, and the re-launch of *Tolka* provides a wonderful opportunity at boat shows on both sides of the border throughout 2012. ⚙️

