

ALEXANDER GRAHAM BELL

By George Constantourakis

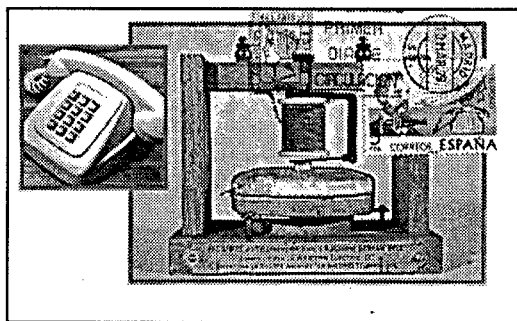
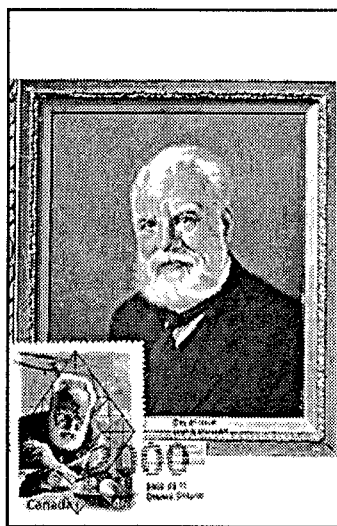
A.G. Bell was born on Mar. 3, 1847 in Edinburgh, Scotland. His family had been recognized as leading authorities in elocution and speech correction. Bell was largely family trained and self-taught. His first professional post was in 1863 as instructor of music and elocution at a school in Elgin, in northern Scotland. In 1864 he became a resident master of Weston House Academy in Elgin, where he did his first studies in sound. Both his two brothers died early from tuberculosis. In 1870, the Bell family worrying about their only surviving son in poor health, chose to move to Canada for its invigorating climate, and settled near Brantford Ontario (*Figure 1*).

In 1871 the elder Bell was warmly received in Boston and asked to introduce his *Visible Speech* method to a school for deaf children. He referred the offer to his son. The young Bell spent several weeks in Boston, where he lectured and demonstrated his father's system of *Visible Speech*. Each phonetic symbol indicated an exact position of the lips, tongue, and soft palate, and could be used by the deaf to imitate the sounds of speech. Bell demonstrated that speech could be taught to the deaf.

In 1872 he opened his own school in Boston for training teachers of the deaf. In 1873 he became professor of vocal physiology at Boston University. Thomas Watson, a young repair mechanic became his assistant in his pursuit of devising an apparatus for transmitting sound by electricity. His scientific experiments were financed by the parents of his two deaf students George Sanders and Mabel Hubbard. Bell and Watson had long nightly sessions, which produced results. On April 6, 1875 he was granted the patent for his multiple telegraph. Bell's health again suffered and he had to return to Brantford, Ont. to recuperate. In the course of his work on telegraph and his study of the human hearing mechanism, Bell almost by accident conceived (while in Brantford, Ont.) of the means to transmit the human voice by the subtle variation of an electric current in response to vibrations of the accompanying sound. Bell thus developed a practical application , the telephone, which had a sound-vibrated membrane at the transmitter, controlling an undulating flow of current in an electric circuit to produce a similar vibration in a membrane at the receiver. On Mar. 7, 1876 the U.S. patent office granted him Patent Number 174 465 covering: "The method of, and apparatus for, transmitting vocal or other sounds telegraphically...by causing electrical undulations, similar in form to the vibrations of the air accompanying the said vocal or other sounds." In July 1877 he founded the *Bell Telephone Company*, after a prolonged and bitter patent litigation, Bell and the company emerged victorious (*Figures 2,3, and 4*).

Also in 1877 Bell married his deaf student Mabel Hubbard, ten years his junior and moved to Washington. There he continued his experiments in communication, culminating in the invention of the photophone (transmission of sound on a beam of light).

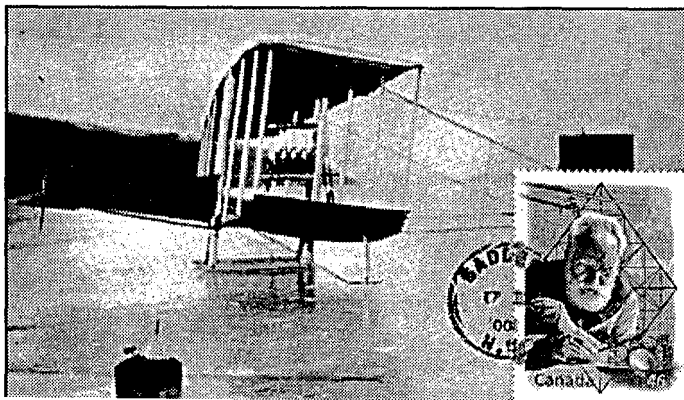
Clockwise from Left. *Figure 1: Portrait of A. G. Bell* by L.P.Panneton at the Brantford Homestead. Stamp part of a block of 4 different honoring Canadian Inventors, , in turn part of the Millennium Collection. Cancel: Mar. 17, 2000, F.D. special, Ottawa, Ont. *Figure 2: Replica of Original Telephone*. The vibrating reed at the top of the instrument was the key to Bell's invention. The reed in the receiver responded to vibrations set up in the transmitter reed. Stamp issued for Centenary of the telephone. Cancel: Mar. 10, 1976 F.D., Madrid. *Figure 3: First call to Chicago*. Bell making first long distance call to Chicago from New York in 1892. Secondary subject at the top right of stamp. Cancel: F.D. special, Ottawa, Ont. *Figure 4: Telephone spans the nation*. from the Celebrate the Century-1910's commemorating first transcontinental telephone line in the States. On card telephone lines and two women using improved telephone models with separate listening and speaking instruments. Cancel: Feb. 3, 1998, F.D. Washington D.C.



In 1880 France honored Bell with the Volta Prize and 50 000 francs (\$ 10 000). Bell financed the Volta Laboratory, where he and his associates invented the Gramophone. In 1885 he bought land at Baddeck on Cape Breton Island, Nova Scotia. There he built a huge mansion complete with research laboratories, in surroundings that reminded him of his native Scotland. In 1885 Bell succeeded Gardiner Hubbard, his father-in-law, as president of National Geographic Society; which in turn he passed on to Gilbert Grosvenor his future son-in-law. Grosvenor, at Bell's inspiration, transformed it from a modest pamphlet into a unique educational journal.

In 1907 Bell, with two young Canadians John McCurdy and Casey Baldwin, and two Americans Lieutenant Thomas Selfridge and Glenn Curtis, formed the *Aerial Experiment Association* at Baddeck Nova Scotia. Bell aimed at getting a man into the air with a heavier-than-air flying machine. Their early flights were made at Hammondsport NY, as well as Baddeck. Following experiments in 1908 with a large man-carrying kite named the *Cygnnet*, the Association built four planes, called "aerodromes" by Bell. Each of which was to find its place in aviation history. On Mar. 12, 1908, the first ever public flight of a flying machine called *Red Wing* was performed by Casey Baldwin, taking off from the ice covered Lake Keuka in New York State. The plane was not at all stable and crashed on her second flight (*Figure 5*). The second "aerodrome" AEA put into the air had white sail cotton on her wings and was called *White Wing*. She had a hinged attachment, like an extra wing on the end of the main wing, which was to make the machine more stable by allowing the position to shift in the wind. *White Wing* was fitted with motorcycle wheels so she could take off from the ground. Curtiss took this plane a record 1 017 ft in 19 seconds, but when McCurdy took her up, AEA had their second crash. The main problem was that the cloth covering the wings was letting too much air through. The third plane called *June Bug*, had the cloth covering of her wings painted with linseed oil, to avoid the problem of letting too much air through. This plane won the *Scientific American's* contest for flying the first public measured kilometer. Meanwhile, in Sept. 1908 Lt. T. Selfridge became the first air fatality in a crash near Washington, as a passenger in a plane that Orville Wright was test flying for the Army.

Figure 5. *Red Wing* the first AEA's machine "aerodrome" to fly.



The fourth plane was the famous *Silver Dart*. Her name comes as a result of the special silvery balloon fabric that was used on her wings. This plane was powered with a water cooled 8-cylinder engine. After a couple of test flights she was shipped to Baddeck NS where McCurdy made the first Canadian aeroplane flight on Feb. 23, 1909 (*Figure 6*). However, the AEA dissolved at the end of March 1909. Glenn Curtiss returned to Hammondsport and begun making aircraft on his own. Baldwin and McCurdy stayed at Baddeck where they formed the *Canadian Aerodrome Company* with help from Bell. On Mar. 27, 1909 Bell spoke to the Canadian Club in Ottawa promoting this company. His speech and the well-publisized flights of the *Silver Dart* were responsible for the Militia Council's decision to ask Baldwin and McCurdy to conduct flying trials at Petawawa (north of Ottawa). The preparations for the trials were widely publisized in the press. On Aug. 2, at Petawawa, the *Silver Dart* with McCurdy at the controls took off and flew about half a mile at a height of about ten feet before landing. However, *Silver Dart* 's fourth trial flight with Baldwin as passenger was her last. McCurdy preparing to land and bothered by the sun struck a sandy knoll, causing the plane to bounce and then crash on her wing. The wings were badly damaged, only the engine remained intact. Baldwin and McCurdy escaped with minor injuries. They now concentrated at assembling their new "aerodrome" the *Baddeck I*.

The range of Bell's inventive genius is represented by 18 patents granted in his name and 12 patents he shared with his collaborators. These included 14 for the telephone and telegraph, 4 for the photophone, 1 for the phonograph, 5 for aerial vehicles, 4 for hydrofoil crafts (secondary subject of Canadian stamp at lower right), and 2 for a selenium cell. Bell was creative till the end. During his last months he was experimenting with distilling drinking water from the sea and the fog. Bell's intense, childlike curiosity drove him to tinker with problems as diverse as aeronautics and genetics. He said a true inventor "can no more help inventing than he can help thinking or breathing". He died on Aug. 2 1922 at Baddeck NS, at the age of 78.

Figure 6. *Silver Dart* AEA's fourth plane. First aircraft Flight in Canada by John McCurdy on Feb. 23,1909 at Baddeck NS. Secondary subject at top left of stamp. Cancel: Mar. 17, 2000, F.D. at Baddeck NS (exact place of event).

