

Speech Therapist to Medical Inventor

Noted for research related to the voice, Alexander Graham Bell, M.D., also pioneered other medical ideas that were far ahead of his time

WILLIAM F. DONOHUE, A.R.I.T.

Pittsburgh, Pennsylvania

Preparing to leave Washington, D.C., on July 2, 1881, to attend commencement exercises at Williams College, Williamstown, Massachusetts, President Garfield was driven to the Baltimore and Ohio Railroad station by Secretary of State Blaine. The waiting room was practically deserted as the President checked his train's departure time with a policeman.

Just as the President and Secretary Blaine turned to walk away, the silence was shattered by gunfire. Mr. Garfield fell, struck by two bullets—one of which had penetrated his torso. He was taken back to the White House in grave condition.

News of the attempted assassination caused an uproar in the capital, and physicians from throughout the city were summoned to the White House. The President's rugged constitution helped carry him through the first few days, but as time passed, it became apparent that unless the bullet had lodged in such a way that it would become safely encysted, the President's survival would depend on its removal.

In Boston, Alexander Graham Bell, recalling his previous experiments with the induction balance, wondered what this technique could do to help locate the bullet. Thus began the famous inventor's most highly publicized medical experiment.

■ Mr. Donohue, a resident of Pittsburgh, is supervisor of the Western Pennsylvania Hospital Department and School of Inhalation

Therapy. Active in organizations related to his specialty, he is a contributing editor of Inhalation Therapy.

With Sumner Tainer, his co-worker from the Volta Laboratory, Bell went to the White House to offer his services. The President's physicians sanctioned his suggestion, and for the next several days, using widely assorted equipment, Bell worked feverishly to perfect an apparatus adapted to carrying out the probe. He devised an induction balance wired to a telephone and an alarm clock. With the system in balance, the clock was inaudible but the presence of a metallic object nearby would throw the system out of balance, whereupon the clock's ticking could be heard on the 'phone.

The first test on the President proved inconclusive, and Bell redoubled his efforts. Toward the end of July, he wrote to inform one of the White House physicians that if it became necessary to experiment on Mr. Garfield's problem again, the chances of success would be much greater.

Bell was asked to make another test almost immediately, but this one, too, was ineffective. The fact that a faint buzzing was heard over a wide area during the experiment puzzled Bell. On checking with White House officials, he learned that despite his request that all metal objects be removed from the immediate area of the stricken President, attendants had failed to remove a spring from the bed on which he lay.

This second unsuccessful attempt gave rise to charges that Bell was merely seeking publicity for himself. Characteristically, he ignored these accusations and continued the work on his apparatus, effecting several improvements. But by then, Mr. Garfield's condition was worse, and further tests could not be carried out. Ironically, about a month after the President's death on September 19, Bell's induction method was successfully applied to veterans still carrying Civil War bullets in their bodies.



DR. BELL

An outgrowth of Bell's induction balance test was his development of the famous telephone probe: a fine needle was attached by wire to one terminal of a telephone, and a metal plate connected with another. Contact of the needle and an embedded bullet produced an audible "click" in the telephone. This device was widely used until it was supplanted by x-ray equipment.

In recognition of his contribution to surgical methodology, Bell received a rare "Honorary M.D." degree from the University of Heidelberg.

Bell's direct interest in medical matters, however, was not confined to the surgical probe, but dated back to his youth. From close association with the work of his father and grandfather, he developed a lifelong interest in speech therapy for the deaf.

In 1872 in Boston, he opened a School of Vocal Physiology and Me-

...of Speech. A year later, having been appointed professor of vocal physiology at Boston University, he transferred his classes there. It was his experiments with the harmonic graph and his knowledge of human speech that eventually led to his invention of the telephone.

Wide Interests

The inventor's agile mind ranged over many medical problems. At the turn of the century, radium was being used to treat superficial cancers, although it had proved ineffective in the treatment of deep-seated ones. This latter point vitally interested Bell—as evidenced in a letter he wrote to a friend. Subsequently published in a medical journal, the letter suggested that the use of radium was not successful in treating deep-seated cancers because of the amount of healthy tissue between the radium and the cancer. He went on to say, "There is no reason why a tiny fragment of radium sealed up in a glass tube should not be inserted in the very heart of the cancer." There is no evidence that Bell claimed priority for having originated this idea, although it was successfully developed and applied during his time.

In another medical area, ideas outlined in his article, *A Proposed Method of Producing Artificial Respiration by Means of a Vacuum Jacket*, anticipated by many years the development of the modern "iron lung."

Present-Day Advances

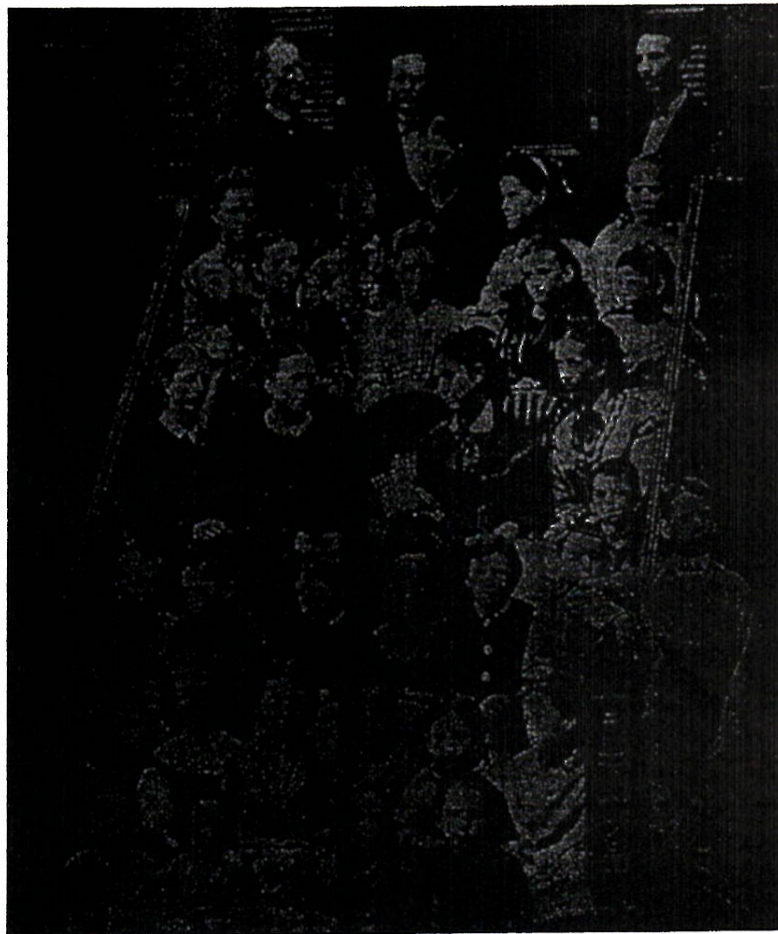
Today, as companies bearing his name develop communications systems more complex than even his fertile mind could foresee, one is aware of a link with Bell's interest in medicine. In 1960, as a result of Bell Telephone Laboratories experiments, an electronic larynx, compact and light in design, was introduced. Although esophageal speech remains the preferred means of communication for laryngectomees, the new device has been widely accepted as a supplementary aid.

One direct outgrowth of Bell's most universally-known invention has

proved a boon to the school child confined to home or hospital by physical disability or prolonged illness: an intercommunication unit engineered for use with telephone lines, and designed to enable the child to keep up in his studies. When he presses a "talk" switch, his voice—carried over private telephone lines linked to an amplifier—reaches a unit in the school classroom. A similar sending unit in the school enables the confined youngster to hear his teacher's questions and comments and his classmates' discussions.

Surely new devices such as these would be wonderfully gratifying to a man who so often worked with children—Alexander Graham Bell, M.D., a speech therapist turned inventor, an inquirer into aerodynamics and genetics, and above all, an earnest, concerned humanitarian.

• At the request of PENNSYLVANIA MEDICINE, the portrait of Dr. Bell, and the photograph of school children and faculty, were provided by the American Telephone and Telegraph Company.



SOUND IDEAS—Best known for scientific contributions related to speech and hearing, A. G. Bell was throughout his life concerned with

the problems of the deaf. This 1871 photograph of pupils and teachers at the Boston School for the Deaf shows Bell at upper right.

One of the greatest achievements in the world is that of the child born deaf who learns to talk.

Alexander Graham Bell