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Summary Information

Repository:	Rare Book and Manuscript Library
Creator:	Armstrong, Edwin H (Edwin Howard), 1890-1954
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Identification of specific item; Date (if known); Edwin H. Armstrong Papers; Box and Folder; Rare Book and Manuscript Library, Columbia University Library.

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Biographical Note

Edwin Howard Armstrong was born on December 18, 1890, in the Chelsea District of Manhattan. He was the first child of John and Emily (Smith) Armstrong. John worked as Vice President of the American branch of Oxford Press, while Emily, a graduate of Hunter College, taught in the New York City public schools. Prior to moving out of Manhattan, Edwin gained two younger sisters, Ethel and Edith. In 1902, the Armstrong family moved north, to 1032 Warburton Avenue, in Yonkers, New York.

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Biographical Note

In 1905, Armstrong entered high school. He already sought to emulate Marconi, the Italian inventor responsible for a system of wireless telegraphy. He began to tinker with the telegraph with companions in his neighborhood who were also taken with the invention. Many of these childhood companions would become lasting friends for the balance of Howard's life. Thomas Styles lived down the block in Yonkers; Randy Runyon was located about a mile away, and William Russell was in the adjacent town of Hastings-on-Hudson. Howard's uncle, Frank Smith, introduced him to Charles R. Underhill, an engineer and inventor for the American Telegraph Company. He furnished Armstrong with experimental apparatus, and more importantly, a constant mentor. Howard would join Underhill frequently after school for years, where they would discuss wireless phenomena.

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Biographical Note

On June 24, 1909, Armstrong graduated from high school. The following September, he entered Columbia University's Department of Electrical Engineering. Armstrong was constantly in the laboratory, conducting endless experiments. Some professors thought the young student needed discipline, he did not follow maintain records of his experiments. But several instructors defended Armstrong, fostering his need for freedom to investigate. Howard distrusted mathematics as the essential proof of phenomena of the physical world and refused to accept the findings of experts. He continued his experiments both at the Columbia lab and in his attic at home. He was determined to find a method that would strengthen the wireless signal.

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Biographical Note

While in his junior year, Armstrong came under the influence of Professor Michael I. Pupin. Pupin was one of the founders of the Columbia University Department of Electrical Engineering, and head of the Marcellus Hartley Research Laboratory. Pupin believed in rigorous scientific experiments, understanding that theory cannot replace results. A successful inventor himself, he soon took notice of Armstrong.

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Biographical Note

In 1912, Armstrong joined the Radio Club of America, which his close friends from Yonkers had all joined. The Club, originally called the Junior Wireless Club Ltd., had been organized in 1909, with Reginald A. Fessenden as the advisor. Fessenden had invented and patented the heterodyne principle in 1902. It was an amateur club that would eventually have a large impact on the development of radio and more specifically, Armstrong's career.

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Biographical Note

The Regenerative Circuit

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Biographical Note

In 1906, Lee de Forest created the "audion", an early vacuum tube, by adding a wire grid to the Edison-Fleming diode. Subsequently, in 1912, he accidentally connected the output circuit of one audion to its own input circuit and obtained a loud howling sound, which he later identified as regeneration. Instead of attempting to understand the hissing or howling sound, he tried to abolish it.

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Biographical Note

When Armstrong began experimenting with the audion, he took numerous measurements in order to ascertain how this tube functioned, eventually devising a circuit that would operate as a powerful amplifier of incoming radio waves. By the winter of 1912, he had discovered that if part of the plates output circuit was fed back to the grid in a controlled manner, the incoming

signals were remarkably strengthened. In addition, he discovered that when feedback was increased sufficiently the circuit could be used as a transmitter by generating high frequency oscillations, a required element for radio communications. He mentioned his idea to instructors at Columbia University, who advised him to contact William Davis, a patent attorney who had secured patents for many of them. Lacking the necessary funds to file, his uncle advised him to prepare a sketch and have it notarized. He did just that, providing him with a record date of January 31, 1913.

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Biographical Note

Armstrong's regenerative circuit led to a nearly twenty year legal battle over patent rights. While the controversy is best known to have been between Armstrong and de Forest, there were actually two other individuals who claimed rights to this invention-- Irving Langmuir and Alexander Meissner.

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Biographical Note

In October 1913, Armstrong, along with another inventor, Irving Langmuir of General Electric, filed patent applications disclosing the principle of radio-frequency regeneration and claimed the arrangement of tuned radio frequency circuits, which is characteristic of the invention. Armstrong's patent was issued on October 6, 1914. This patent disclosed the circuit arrangement in its non-oscillating stage, that of an improved receiver of wireless signals. By now his patent attorney, William Davis, recommended he incorporate the transmitting ability into the same patent. Armstrong refused and the regenerative circuits oscillating capacity was disclosed in a separate patent application, filed December 18, 1913.

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Biographical Note

A German inventor, Alexander Meissner, filed a United States Patent application on the regenerative circuit on March 16, 1914. Four days later, Lee de Forest filed an application for

his "ultra-audion". In De Forest's original claims, he considered his device a detector, not an amplifier (transmitter).

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Biographical Note

In November 1913, de Forest delivered a paper to the Institute of Radio Engineers (IRE) on the subject of "The audion, detector and amplifier". He gave an explanation of the action of the audion with regard to circuit change. He made no mention of feedback and this presentation served to reinforce the fact that he did not understand the audion qualities or how it functioned. It was not until after Armstrong's paper "Some Recent Developments in the audion Receiver", was delivered to the IRE in New York on March 3, 1915, and published in September, that de Forest changed his patent disclosure. De Forest filed for patent with oscillating features in September 1915 and was later issued a second patent, claiming a date of invention prior to March 1913, disclosing specifics of regeneration.

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Biographical Note

This was the patent that the United States Supreme Court would, on May 21, 1934, decide to sustain in favor of de Forest. The decision of the Supreme Court was the thirteenth pronouncement by a judicial or administrative tribunal with regard to the question of priority between Armstrong and de Forest. These two men fought each other in the courts both as individuals and through the corporations (Westinghouse Electric and American Telephone and Telegraph, respectively) that had purchased rights to their patents. Prior to the Supreme Court decision, six of the tribunals decided in favor of Armstrong and six had decided in de Forest's favor. The scientific community, especially the engineering community, believed that in favoring de Forest's claim the Court had made a large mistake, one based on the justices' lack of technical training and understanding.

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Biographical Note

In 1934, the IRE held a convention in Philadelphia. Armstrong indicated that he would like to return the Medal of Honor he had received in 1917 for his discovery of regeneration. He

believed that since the United States Supreme Court had decided against him, it was his duty to return what may have been awarded to him in error. The IRE President, along with the Board of Directors unanimously agreed that Armstrong should be reaffirmed as the recipient of the 1917 Medal of Honor, so instead of allowing Armstrong to return his Medal, they restated the award.

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Biographical Note

The Super-heterodyne

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Biographical Note

When the United States entered World War I, Armstrong enlisted in the Signal Corps. In 1917 he was posted in France and placed in charge of the Radio Group of the Research Section of the Division of Research and Inspection. This Division had been created in order to examine any existing equipment manufactured by the Europeans for the American Expeditionary Forces. The Major set off to France but en route he was delayed in England due to heavy fog. While there, he ventured to London, stopping by the Marconi offices where he met Henry J. Round.

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Biographical Note

Round was an engineer with Marconi who, at the time, was in charge of the Admiralty's wireless direction-finding stations. It was here that Armstrong was introduced to Round's short-wave equipment. Round had created these amplifiers by designing his own vacuum tube (V24). These tubes were not of military use to the French or the Americans, but they captured Armstrong's attention and he concluded that this was a problem that required further research.

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Biographical Note

Armstrong had studied heterodyne circuitry for quite a while and understood it well. This meeting with Round pushed him further and he continued to examine the problem of receiving weak high frequency signals. In 1918, Harry W. Houck, a sergeant in the United States Army, was sent to Paris to assist Armstrong with his work. They worked together to solve the problem of detecting high frequency waves and converting them to a lower frequency range audible to the human ear. After observing a bombing raid in Paris, Armstrong was inspired to improve the methods of locating aircraft. He used the heterodyne principle to bring short-wave frequencies down to the range of his long-wave amplifier. He worked out the necessary experiments needed to prove his forthcoming invention, writing down the proposed method in June 1918 with Major Buckley signing off as witness.

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Biographical Note

Following his proposed methodology to Major Buckley, Armstrong needed assistance to stage these experiments and create the necessary apparatus. With war work taking precedence and his fellow officers tied up in other pressing projects, his work was delayed. The first model was not ready until November. Armstrong first applied for patent in France in December 1918 and for United States patent in February 1919.

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Biographical Note

In early 1919, Armstrong was raised to permanent rank of Major. He also received the Chevalier de la Legion d'honneur from General Ferrie, Head of the French Military Communications Division. When Armstrong returned from the war he presented his paper, "A New System of Short Wave Amplification," to the Institute of Radio Engineers in December of 1919, delineating his new receiver.

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Biographical Note

In 1920, Westinghouse purchased Armstrong's regeneration and superheterodyne patents. Also, around this time, American Telephone and Telegraph (AT & T) purchased Lucien Levy's patent for essentially the same invention. Levy's patent referred to a different use of the technology than did Armstrong's, resulting in the United States Patent Office not catching the conflict. Someone eventually noticed this apparent conflict and priority needed to be resolved.

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Biographical Note

The Court of Appeals in the District of Columbia ruled in Levy's favor and his patent was issued on November 5, 1929, with a priority date of August 4, 1917 (he had filed 6 months prior to Armstrong). While Levy, by law, is considered the inventor of the superheterodyne method, Armstrong is recognized as bringing about its commercialization through the single tuning knob superheterodyne receiver.

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Biographical Note

The Super-regenerative Circuit

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Biographical Note

In 1922, Armstrong devised the super-regenerative circuit, a detector with much higher sensitivity. In June, RCA and Armstrong made a deal; Armstrong received two hundred thousand dollars in cash and sixty thousand shares of stock for his super-regeneration invention. It was around this time that he met Marion MacInnis who worked as David Sarnoff's secretary at RCA. In December of 1923, they married at her parents' home in Merrimac. Radio

broadcasting was now becoming very popular, what had begun as one station in 1920 had grown to over 500 stations.

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Biographical Note

Wide-band Frequency Modulation System

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Biographical Note

For many years Armstrong and Pupin had been investigating how to eliminate the problem of natural and man-made noise that plagued AM radio, with no success. At the time, the method accepted of reducing noise was in narrowing the band of frequencies used to transmit radio waves. The conventional theories taught that a narrower band of frequencies utilized for broadcasting would allow less noise into the signal. In 1931, Armstrong took the opposite approach and pursued wideband frequency modulation as a remedy for noise.

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Biographical Note

On December 26, 1933 about 18 months after he began experimenting with wide-band FM, Armstrong had secured patent number 1,914,069, titled Radio Signaling. In addition, he secured three other patents; patent number 1,941,068 titled Radio Signaling, patent number 1,941,066 titled Radio Signaling System, and the last issued in 1933, patent number 1,941,067 titled Radio Broadcasting and Receiving.

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Biographical Note

Armstrong first approached RCA, offering them first option on his new invention. In the spring of 1934 he set up his system in the Empire State building and for the next few years RCA engineers, alongside Armstrong, tested FM. During the summer of 1934, tests were conducted between the Empire State building and Westhampton Beach, Long Island. The results were excellent, but proof was needed from a site located at a further distance. The receiver was moved to the Haddonfield, New Jersey home of Harry Sadenwater, an engineer at RCA. This experiment established that even with longer range, the signals could be heard loud and clear.

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Biographical Note

Alpine, New Jersey

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Biographical Note

Still, RCA would not buy Armstrong's frequency modulation system. So he attempted to obtain permission from the Federal Communications Commission to build a high powered FM station in 1935. First, the FCC denied his request, but he was finally able to secure an experimental license after he hired an attorney to help him. Armstrong began constructing his station in Alpine, New Jersey. In 1936, he poured a large sum of money into it, selling some of his RCA stock to do so. There were no FM broadcast stations in existence (with the exception of W2AG, his longtime childhood friend Randy Runyon's station, operating out of Yonkers, New York), hence all the apparatus would have to be built from scratch. Armstrong oversaw the project from top to bottom.

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Biographical Note

Station W2XMN went on the air with a regular operating schedule in July 1939. Immediately following, various other FM stations went on the air, all under experimental licenses. These stations now wanted to go commercial and thus were applying to the FCC to do so. Finally, at the end of 1939, the FCC began to study the commercial possibilities of FM broadcast.

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Biographical Note

The Federal Communications Commission

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Biographical Note

In January 1941, the FCC authorized the commercial development of FM. When the United States entered World War II, there were under one hundred commercial FM stations authorized, but applications were rolling in. The FCC froze the civilian electronics industry; only FM stations already broadcasting could continue. It became clear to the FCC that they would need to establish standards for the post-war electronics industry. A new allocation scheme for the use of frequencies above 30 MHz would become necessary.

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Biographical Note

In November 1942, at a joint meeting of the IRE and the electrical engineering department of the Radio Manufacturers Association (RMA), FCC Commissioner James L. Fly encouraged the industry to establish an organization that could provide the FCC with engineering advice for the development of frequency allocation and system standards. Fly's proposal resulted in the establishment of the Radio Technical Planning Board (RTPB), set up in September 1943.

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Biographical Note

The RTPB was divided into 13 panels, each responsible for recommendations pertaining to various electronic industry standards. FM broadcasting, including frequency allocations and standards was the responsibility of Panel 5.

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Biographical Note

Various hearings were held where a multitude of experts in the field testified. Generally accepted was that the majority of experts, both on the applicable panel, or consulted, agreed that the FM frequency allocations should remain where they were in the 40-50 MHz vicinity. A few experts felt that there was evidence of atmospheric disturbances that could cause interference in the frequency band that was currently being used. The FCC then began to investigate a possible move for FM frequency allocation, to the 100 MHz vicinity.

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Biographical Note

In June 1945, after multiple hearings and evidence from an engineer employed by the FCC, Kenneth Norton, the FCC ordered FM stations to broadcast in the 88-106 MHz band. This decision rendered the old FM system, in use since January 1941, obsolete. Engineers, manufacturers and broadcasters had to begin again from scratch.

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Biographical Note

A few years prior to the FCC decision to shift frequency allocations, RCA had begun work on FM. Negotiations between Armstrong and RCA for use of his FM System patents had never

come to fruition. An engineer employed with RCA, Stuart Seeley, had invented the "radio-detector" for RCA, who claimed that Armstrong's patents were not used. In fact, the Seeley invention did appropriate two of Armstrong's inventions, the limiter and detector. RCA was licensing the rights to what it claimed was its FM invention, to other manufacturers, some of which were Emerson, Motorola and Philco. With the shift in frequency band, RCA was back on a level playing field.

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Biographical Note

Radar and FM Multiplexing

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Biographical Note

Armstrong set out to prove the FCC wrong so he leased a cottage on Westhampton Beach, Long Island and sent John Bose to reside there. Signals were sent from Alpine and the documentation of FM propagation was extensive. He produced incontrovertible evidence that FM could work well in a lower frequency band. At the same time, he also conducted experiments to prove that FM transmission was not limited to short distances. He transmitted from Alpine, high powered FM signals that bounced off the ionosphere and was received by a mobile receiver in Alabama. The pentagon and Bell Labs recognized the importance of this discovery and continued development with Massachusetts Institute of Technology (MIT), REL and Bell Labs. The result was early warning radar.

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Biographical Note

At the start of the war, Armstrong offered the United States government use of his FM patents royalty free. Unfortunately, his bills for the Columbia Lab and Alpine station were building so his attorney, Al McCormack, encouraged Armstrong to accept government contract work. At the time, Armstrong was investigating long-range radar. As a result of incoming work, Armstrong hired another assistant, Robert Hull, a recent graduate of Columbia University, to join his investigations of continuous wave radar.

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Biographical Note

He had adapted frequency modulation to radar to extend the range of detection far beyond conventional methods. His research provided the basis for long-range radar in use today. Armstrong had still been working on radar and in January 1946, his radar system was tested at the US Army Signal Corps lab in Fort Evans, located in Belmar, New Jersey. Army engineers bounced the first radio signal off the moon and back to earth. His radar system proved that FM waves could penetrate the ionosphere.

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Biographical Note

In March 1953, a new invention is announced, FM multiplexing. Armstrong had developed the invention with John Bose, which facilitates a single FM station to transmit simultaneously, two or three different signals over the same FM wave. This invention made stereo broadcasting possible.

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Biographical Note

Wide-band Frequency Modulation System--Patent Infringement

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Biographical Note

On July 22, 1948, Armstrong's attorney, McCormack, filed suit against RCA and NBC in Wilmington, Delaware. The main charge being infringement of his five basic FM patents. In addition, the suit also charged that RCA deliberately set out to retard the production of FM. McCormack was assisted by Dana Raymond (who had worked at Cravath, Swaine & Moore),

and the attorney who had filed all of Armstrong's patents since super-regeneration, Albert Nolte, assisted as well.

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Biographical Note

In March 1953, a new invention was announced, FM multiplexing. Armstrong had developed the invention jointly with John Bose, which facilitates a single FM station to transmit simultaneously, two or three different signals over the same FM wave. This invention made stereo broadcast possible.

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Biographical Note

The litigation continued and Armstrong began to become not only financially drained, but physically drained as well. At the end of the fifth year of litigation, 1954, Armstrong took his own life.

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Biographical Note

His widow Marion would continue the battle against RCA and twenty other companies who had infringed Armstrong's FM patents. It would not be until 1968, when the final pending suit and ruling was made in Armstrong's favor. All twenty-one companies had either settled or were ruled infringers by the courts.

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Honors and Awards:

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Degree of Doctor of Science Columbia University, 1929

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L'Universite Laval, 1948

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Medal of Honor, Institute of Radio Engineers, 1917

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Chevalier de la Legion d'Honneur, 1919

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Armstrong Medal, established by The Radio Club of America, 1935

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Egleston Medal, Columbia University, 1939

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Holley Medal, American Society of Mechanical Engineers, 1940

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National Modern Pioneer Award, National Association of Manufacturers, on the 150th Anniversary of the American Patent System, 1940

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Biographical Note

Medal of Class on 1989--School of Mines, Columbia University, 1941

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Franklin Medal, the Franklin Institute, 1941

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Biographical Note

John Scott Medal, Awarded by the Board of Directors of City Trusts, City of Philadelphia, 1942

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Biographical Note

Edison Medal, American Institute of Electrical Engineers, 1942

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Biographical Note

Medal for Merit (United States) with Presidential Citation, 1947

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Biographical Note

Radio Club Armstrong Medal along with Ernest V. Amy, George E. Burghard, Milton Cronkhite, Paul F. Godley, John F. Grinan, and Walter P. Inman, for the first shortwave transoceanic signals (1BCG), 1950

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Biographical Note

Washington Award, Western Society of Engineers, 1951

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Biographical Note

Lion Award, Columbia University Alumni Club of New Jersey, 1953

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Biographical Note

Honorary Membership, Institute of Radio Engineers, Australia

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Biographical Note

Honorary Membership, Franklin Institute

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Biographical Note

Honorary Membership, American Institute of Electrical Engineers

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Summary

Professional and personal files including Armstrong's correspondence with professional associations, other engineers, and friends, his research notes, circuit diagrams, lectures, articles, legal papers, and other related materials. Of his many inventions and developments, the most important are: 1) the regenerative or feedback circuit, 1912, the first amplified radio reception, 2) the superheterodyne circuit, 1918, the basis of modern radio and radar, 3) superregeneration, 1922, a very simple, high-power receiver now used in emergency mobile service, and 4) frequency modulation - FM, 1933, static-free radio reception of high fidelity. More than half the files concern his many lawsuits, primarily with Radio Corporation of America, over infringement of the Armstrong patents. Litigation continued until 1967. Other files deal with his work in the Marcellus Hartley Research Laboratory at Columbia University, 1913-1935, and with the American Expeditionary Forces in France during World War I, his Air Force contracts for communications development, Army research during World War II, the Radio Club of America, the Institute of Radio Engineers, FM development at his radio station at Alpine, N.J., the use of FM in television, his involvement in Federal Communications Commission hearings and legislation, and his work with the Zenith Radio Corporation. Also, letters to H.J. Round

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Summary

1990 ADDITION: Files from the firm of Cravath, Swaine & Moore. Files, dating from the late 1920s to the 1960s, pertaining to Professor Armstrong's litigation with Lee de Forest over the regeneration patents; his suit against RCA and other infringers of his FM patents; the original letters patent, among which are those for his FM system; and financial matters relating to the

Armstrong laboratories, the FM station in Alpine, New Jersey, other real estate properties, and his estate

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Arrangement

This collection is arranged in 6 series.

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Administrative Information

Publication Statement

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Acquisition

The Armstrong Memorial Research Foundation, 1977; Harold A. Wheeler, 1983; Pennie, Davis, Marvin & Edmonds, 1983; Keith E. Mullinger [Pennie, Davis, Marvin & Edmonds], 1984; Jerry Granat via the Armstrong Memorial Research Foundation, 1985; Cravath, Swaine and Moore, 1991; Columbia University Amateur Radio Club (W2AEE) via Henry Alvestad, 1992; Robin John Morecroft, 1995; Purchase, 1995; Dana Raymond [Brumbaugh, Graves, Donohoe & Raymond], 1997; Nancy Hull, 2007; Carlton Moseley, 2010; Steve McGrath, 2011.

Immediate Source of Acquisition

Gift of the Armstrong Memorial Research Foundation, 1977.

Immediate Source of Acquisition

Gift of Keith E. Mullinger, 1983.

Immediate Source of Acquisition

Gift of Pennie & Edmonds, 1984.

Immediate Source of Acquisition

Gift of Jerry Granat, via the Armstrong Memorial Research Foundation, 1985.

Immediate Source of Acquisition

Gift of Cravath, Swaine & Moore, 1990.

Immediate Source of Acquisition

Gift of the C.U. Amateur Radio Club (W2AEE) via Henry Alvestad, 1992.

Processing Information

Processed by Henry Rowen 12/77; BRC 3/79; BRC 4/85; HR 3/86; AH 1991; HR 6/92

Processing Information

Cataloged Christina Hilton Fenn 03/24/1989.

Processing Information

Papers Processed AH 02/06/1991.

Processing Information

Laboratory notebook Processed HR 06/02/1992.

Accrual

No accruals are expected

Processing Information

This collection was processed by Jennifer Comins; Carolyn Smith; Jennifer Howard, GS EE '11; Hilary Hanson, CC '11; Brian Mackus, GS '12; and Meredith Wisner, Pratt Institute, MLIS '11. Finding aid written by Jennifer Comins in October 2010.

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Related Materials

Selected Related Material-- at Columbia

[James Laurence Fly Papers 1920-1977](#), Rare Book and Manuscript Library, Columbia University Libraries

Selected Related Material-- at Columbia

[Michael Idvorsky Pupin Papers 1800-1995](#), Rare Book and Manuscript Library, Columbia University Libraries

Selected Related Material-- at Columbia

[Archived Web Site of the Armstrong Memorial Research Foundation, 2013-present](#), Columbia University Libraries

Selected Related Material-- at Other Repositories

George H. Clark Radioana Collection, c. 1880-1950, Archives Center, National Museum of American History, Smithsonian Institution, Washington, DC

Selected Related Material-- at Other Repositories

Records of the Federal Communications Commission, National Archives, Washington, DC

Selected Related Material-- at Other Repositories

Records of the National Institute of Standards and Technology, National Archives, Washington, DC

Selected Related Material-- at Other Repositories

United States Army Communications Electronics Museum, Fort Monmouth, New Jersey

Selected Related Material-- at Columbia

[Armstrong Memorial Research Foundation Records](#). Columbia University Libraries.

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Controlled Access Headings

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- World War, 1939-1945
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- Patent suits
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- Superheterodyne receivers -- Research
- Radio -- Law and legislation
- Radio -- Patents
- Radio -- Receivers and reception -- Research
- Radio frequency modulation -- Research
- Radio -- Transmitters and transmission -- Research
- Alpine (N.J.)
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- Account books
- Agreements

- Annual reports
- Applications
- Articles
- Audiocassettes
- Audiotapes
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- Bibliographies
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- Biographies (literary works)
- blueprints (reprographic copies)
- Briefs
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- Charts (graphic documents)
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- College teachers
- Inventors
- Electrical engineers
- Armstrong, Edwin H (Edwin Howard), 1890-1954
- Burger, Warren E., 1907-1995
- Bush, Vannevar, 1890-1974
- Butler, Nicholas Murray, 1862-1947
- Coudert, Frederic R (Frederic René), 1871-1955
- De Forest, Lee, 1873-1961
- De Voto, Bernard, 1897-1955
- Dewey, Thomas E (Thomas Edmund), 1902-1971
- Donovan, William J (William Joseph), 1883-1959
- Eisenhower, Dwight D (Dwight David), 1890-1969
- Farley, James A. (James Aloysius), 1888-1976
- Fermi, Enrico, 1901-1954
- Hoover, Herbert, 1874-1964
- Kaempffert, Waldemar, 1877-1956
- La Guardia, Fiorello H (Fiorello Henry), 1882-1947
- Lodge, Henry Cabot, Jr., 1902-1985
- McCormick, Robert R. (Robert Rutherford), 1880-1955
- Marconi, Guglielmo, 1874-1937
- Murray, Thomas E (Thomas Edward), 1860-1929
- Paley, William S (William Samuel), 1901-1990
- Pupin, Michael, 1858-1935
- Round, Henry J
- Sarnoff, David, 1891-1971
- Stimson, Henry L (Henry Lewis), 1867-1950
- Stokowski, Leopold, 1882-1977
- Sulzberger, Arthur Hays, 1891-1968
- Woodbridge, Frederick James Eugene, 1867-1940
- Young, Owen D., 1874-1962
- United States. Federal Communications Commission
- United States. Army. American Expeditionary Forces
- United States. Air Force
- Radio Corporation of America
- Columbia University. Marcellus Hartley Research Laboratory
- Zenith Radio Corporation
- Radio Club of America
- Institute of Radio Engineers

- Cravath, Swaine & Moore

Collection Inventory

Series I: Correspondence, 1910-1975

Scope and Contents

This series is divided into the following five types of correspondence: general, catalogued, early, laboratory and carbon correspondence. The catalogued correspondence is alphabetical by correspondent. The remainder of the series is chronological with the general containing schematic drawings, notes and photographs. Diagrams and notes on the regenerative circuit and superheterodyne can be found along with correspondence with Armstrong's sisters, Ethel and Edith, as well as his mother, Emily, and Charles Underhill, H.J. Round, C.V. Logwood and Irving Langmuir. The first box within this series contains the contents of a binder entitled "Instructions for Filing." These materials appear to indicate the manner in which Armstrong originally titled and filed various materials within his office and laboratory.

Title/Description	Instances	
Filing System for E. H. Armstrong Originally Contained in a Binder--Instructions for Filing Correspondence, Clippings, Photostats, Publications, Lab Files, and Index to FCC Proceedings,, undated <u>Physical Description:</u> (3 Folders)	box 260	folder 1 to 3
Catalogued		
Burger, Warren Earl, 1953	box 1	folder 1
Bush, Vannevar, 1951-1952	box 1	folder 1
Butler, Nicholas Murray, 1935-1944	box 1	folder 1
Coudert, Frederic Rene, Jr., 1946-1949	box 1	folder 1
De Forest, Lee, 1926, 1940, 1926, 1940	box 1	folder 1
De Voto, Bernard Augustine, 1951	box 1	folder 1
Dewey, Thomas Edmund, 1940-1950	box 1	folder 1
Donovan, William Joseph, 1953	box 1	folder 1
Eisenhower, Dwight David, 1948-1951	box 1	folder 1
Espenschied, Lloyd, 1952	box 1	folder 1
Farley, James A., 1948	box 1	folder 2
Fermi, Enrico, 1940	box 1	folder 2
Ferrie, Gustave Auguste, 1922	box 1	folder 2
Fuller, Alvan Tufts, 1952	box 1	folder 2
Hoover, Herbert Clark, 1950-1951	box 1	folder 2

Kaempffert, Waldemar Bernhard, 1930-1953	box 1	folder 2
LaGuardia, Fiorello H., 1947	box 1	folder 2
Lodge, Henry Cabot, Jr., 1953	box 1	folder 2
McCormick, Robert R., 1946	box 1	folder 2
Marconi, Guglielmo, 1914	box 1	folder 2
Maxim, Hiram Percy, 1916	box 1	folder 2
Murray, Thomas Edward, 1950-1953	box 1	folder 2
Northrop, John Howard, 1946	box 1	folder 2
Paley, William S., 1948	box 1	folder 2
Pupin, Michael Idvorsky, 1934	box 1	folder 2
Rockefeller, William Goodsell, 1922	box 1	folder 3
Round, H.J., 1936-1953	box 1	folder 3
Sarnoff, David, 1914-1950	box 1	folder 3
Stimson, Henry L., 1941	box 1	folder 4
Stokowski, Leopold, 1940-1946	box 1	folder 4
Sulzberger, Arthur Hays, 1943-1953	box 1	folder 4
Tyson, Levering, 1940	box 1	folder 4
Weeks, Raymond, 1923	box 1	folder 4
Woodbridge, Frederick J. E., 1922	box 1	folder 4
Young, Owen D., 1925-1950	box 1	folder 4
General		
1910-1915	box 1	folder 5-8
<u>Physical Description:</u> (4 Folders)		
Scope and Contents		
Correspondents Include Charles Underhill, C.V. Logwood, Irving Lanmuir, Albert Hull. Alfred Goldsmith of the IRE, William Davis of Pennie, Davis and Goldborough, and L.F.H. Betts of Sheffield, Bentley and Betts--Armstrong's Early Audion Drawings and "Notes on Distribution of Resistance.."		
1916-1922	box 2	folder 1-8
<u>Physical Description:</u> (8 Folders)		
Scope and Contents		
Correspondents Include Armstrong's Mother and Sister's Ethel and Edith (Crick), William		

Davis, Alfred Goldsmith, H.J. Round, Herman Burgi--Includes Invoices from Pennie, Davis and Marvin--Radio Club of America Meeting Minutes--Armstrong Notes and Drawings--Paper Titled "A Method of Receiving Short Continuous Waves" Witnessed by Major O.E. Buckley--Cables of Transmittal--Atlantic Tests--Patent Litigation--World Championship Boxing Contest via Radio Telephone--Requests for Information Regarding Armstrong's Superregenerative Receiver--An American Expeditionary Forces Identity Card (photographs)

1922-1929	box 3	folder 1-6
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Physical Description: (6 Folders)

Scope and Contents

General Interest and Requests Regarding Armstrong's Superregenerative System and Patents (French, German)

1913-1954	box 4	folder 1-8
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Physical Description: (8 Folders)

Scope and Contents

Paper on Modulation, Graphs and Handwritten Notes-- "The Audion Oscillator" by Michael Pupin--Correspondence Regarding United States Supreme Court Ruling in 1934--Awards, Citations and Medals--Alpine Radio Station--Freed Radio Corporation, Comparisons of Frequency and Amplitude Modulation--Correspondence to Editors of Various Newspapers--Foreign Correspondents

1924-1930	box 4	folder 9
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Scope and Contents

Regarding the Superheterodyne

1931-1954	box 5	folder 1-7
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Physical Description: (7 Folders)

Scope and Contents

Last Will and Testament of E. H. Armstrong dated April 28, 1942--Radio Manufacturers Association--Correspondence with American Telephone and Telegraph, Blueprint of Horizontal Twin Rhombic Transmitting Antenna (Photographs)

1941-1954	box 6	folder 1-11
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Physical Description: (11 Folders)

Scope and Contents

Radio Stations and Broadcasting Companies, Regarding Frequency Modulation, Includes Notes on Schenectady Receiver; Associated Musicians of Greater New York

1948-1950 box 7 folder 1-8

Physical Description: (8 Folders)

Scope and Contents

American Broadcasting Company--Radio Stations and Broadcasting Companies, Regarding Frequency Modulation

1950-1955 box 8 folder 1-11

Physical Description: (11 Folders)

Scope and Contents

Correspondents include John M. Conly of Atlantic Monthly and With Regard to Armstrong's Article in Midwestern Engineer and the 1951 Washington Award--Radio Stations and Broadcasting Companies--Popular Mechanics Fiftieth Anniversary Hall of Fame--American Institute of Electrical Engineers, Includes Armstrong's Application and Election to Membership--Marion Armstrong to H.J. Round--Federal Communications Commission

1953-1954 box 9 folder 1-3

Physical Description: (3 Folders)

Scope and Contents

Includes Letter From Reverend Thorton Penfield to Ethel Hammond Regarding Edwin H. Armstrong's Death

Armstrong Memorial Research Foundation, 1954-1971 box 9 folder 4-5

Physical Description: (2 Folders)

Laboratory

Lewis, Harold Miller. Laboratory Notebook, Paris, 1919 box 13V
Physical Description: 1 bound volume 137 pages Shared MS 1

Scope and Contents

(Record of first experiments on the superheterodyne, with six related items)

Biographical / Historical

Lewis was working under Armstrong at the U. S. Army Signal Corps Laboratory in Paris.

Immediate Source of Acquisition

Gift of Keith E. Mullinger of Pennie & Edmonds, patent attorneys for Armstrong, 1983

1929-1936--Graphs, Handbooks, Purchase Receipts, Instruction Books on Assembly from General Radio Co.--Meeting Minutes of the RMA Section of the Joint RMA-SAE Committee on Radio Interefernce--Institute of Radio Engineers--Application for Proposed Location of Transmitter Tower--Department of Police, New Jersey Regarding Two Way Communication <u>Physical Description:</u> (4 Folders)	box 9	folder 6-9
1936-1939--Institute of Radio Engineers, Philadelphia Section "Frequency Modulation" by E.H. Armstrong--Correspondence From Experimenters and Inventors in Radio--Schematic Diagram for Crystal Oscillator--Regarding Ultra Short Waves (U.K.W), Paper on "Static Elimination" for Transmittal, Calcutta--Federal Communications Commission; RCA; Columbia Broadcasting System--Alpine Tower <u>Physical Description:</u> (9 Folders)	box 10	folder 1-9
1939-1943 <u>Physical Description:</u> (8 Folders)	box 11	folder 1-8
1943-1944 <u>Physical Description:</u> (7 Folders)	box 12	folder 1-7
1945-1946 <u>Physical Description:</u> (4 Folders)	box 13	folder 1-4
1947 <u>Physical Description:</u> (2 Folders)	box 14	folder 1-2
Carbon Copies		
1940-1942 <u>Physical Description:</u> (4 Folders)	box 14	folder 3-6
1947-1948 <u>Physical Description:</u> (6 Folders)	box 15	folder 1-6
1948-1949 <u>Physical Description:</u> (6 Folders)	box 16	folder 1-6
1950-1951	box 17	folder 1-6

Physical Description: (6 Folders)

1951-1953	box 18	folder 1-6
<u>Physical Description:</u> (6 Folders)		
1953	box 19	folder 1-2
<u>Physical Description:</u> (2 Folders)		
To Edith Beardsley, 1975	box 19	folder 3

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Series II: Writings of EHA, 1913-1953

Scope and Contents

These records are organized chronologically. Many are standard publications written by E.H. Armstrong, some are annotated. There are drafts with annotations which are typically addresses or speeches. Also included are newspaper articles, statements and testimony.

Title/Description	Instances	
Notorized Feedback Circuit Diagram--Photostat, 1913 January	box 20	folder 1
<i>Electrical World</i> Diagram of Operating Features of the Audion,, 1914 December 12	box 20	folder 2
Diagram of Reactance Tube, 1915	box 20	folder 3
The Audion as a Detector Amplifier, 1915 (German), 1915	box 20	folder 4
"Some Recent Developments In the Audion Receiver," 1915 March 3	box 20	folder 5
"Study of Heterodyne Amplification By the Electron Relay," Typed Publication with Corrections, [1916]	box 20	folder 6
"A Study of Heterodyne Amplification By the Electron Relay," 1916 October	box 20	folder 7
"Operating Features of the Audion," 1917 August 17	box 20	folder 8
"A New System of Short Wave Amplification, 1921	box 20	folder 9
"The Super-Heterodyne: Its Origin, Development, and Some Recent Improvements," 1921 February	box 20	folder 10
"Some Recent Developments of Regenerative Circuits," 1922 June	box 20	folder 11
"Method of Reducing the Effect of Atmospheric Disturbances," 1927 August 27	box 20	folder 12
New York Herald Tribune--"Major Armstrong Gives Views on Audion History," 1930 December 21	box 20	folder 13

New York Times--"Tube That Gave Radio A Magic Touch," 1931 February 8	box 20	folder 14
Disclosure of Television System, 1933 May 8	box 20	folder 15
Westhampton Beach Log, 1934 June 9	box 20	folder 16
Dutch Patent Application, 1934-1935	box 20	folder 17
Predication Made Before Radio Club of America, 1935-1936	box 20	folder 18
<i>New York Times Prediction</i> ," 1936 January 5	box 20	folder 19
"A Method of Reducing Disturbances In Radio Signaling By a System of Frequency Modulation"--Annotated,, 1936 May	box 20	folder 20
Federal Communications Commission (FCC)--Testimony Before the, Docket No. 3929 1936 June 17, 1936 June 17	box 20	folder 21
Improved System For Reinforcing Signal with Respect to Ignition Noise--Diagram,, 1937	box 20	folder 22
<i>New York Times</i> Armstrong's Challenge Regarding Orin E. Dunlap's Article on W2XMN,, 1939 January 1	box 20	folder 23
FCC, Testimony Before, Docket No. 5805--Includes Excerpts, 1940 April 22	box 20	folder 24
<i>Radio Today</i> "Major Armstrong Clears Up Point in FM-Tele Issue," Letter to the Editor,, 1940 May	box 20	folder 25
<i>Electrical Engineering</i> "Evolution of Frequency Modulation"--Inscribed,, 1940 December	box 20	folder 26
"Frequency Modulation and Its Future Uses," 1941	box 20	folder 27
Advertisement--"An Important Message to the Radio Trade Regarding FM Receivers," 1941	box 20	folder 28
Offer to the War Department of Free Use of FM Patents-- Clippings and Answers From Secretary's of War and Navy,, 1941	box 20	folder 29
<i>Annals of the American Academy of Political and Social Science</i> "Frequency Modulation and Its Future Uses," 1941 January	box 20	folder 30
"The New Radio Freedom"--Paper Read at the Franklin Institute on Receipt of Medal,, 1941 May 21	box 20	folder 31
"Vagaries and Elusiveness of Invention"--Edison Medal Acceptance Speech,, 1943 January 27	box 20	folder 32
<i>Broadcasting</i> "Like Story of the Superheterodyne, A Set for Every Purse," 1943 April 26	box 20	folder 33
<i>Scientific Monthly</i> "Nikola Tesla," 1943 April	box 20	folder 34
FM Broadcasters, Inc--Address to the Fifth Annual Meeting at the Commodore Hotel,, 1944 January 26	box 20	folder 35

The Senate Interstate Commerce Committee, Testimony Before--"The History of Frequency Modulation"--As Printed in <i>FM Radio-Electronics Engineering</i> 1944 March	box 20	folder 36
American Newspaper Publishers Association--"The Story of FM Broadcasting," 1944 April 27	box 20	folder 37
<i>FM and Television</i> "The Original Disclosure of FM, Part 1," 1944 June	box 20	folder 38
Annual Meetings of the American Society of Mechanical Engineers, Address Before the--"Ingenuity," 1944 July	box 20	folder 39
<i>FM Radio</i> "Electronics Mathematical Theory vs. Physical Concept," 1944 August	box 20	folder 40
<i>FM and Television</i> "High Points of FM History," 1944 August	box 20	folder 41
National Association of Broadcasters, Executive War Conference, Address to--"The Postwar Future of Broadcasting," 1944 August 31	box 20	folder 42
Memorandum Written "In Response to the Commission Request for Added Details and Reasons for My Protest of the Commission's Action..."--In Regards to Frequency Shifts--Typed Paper Regarding Ancient Propagation Discoveries--Typed Speech Prepared for IRE To Return Medal of Honor, With Corrections, 1945, undated, 1945, undated	box 20	folder 43
FCC Briefs--Docket No. 6651 1945 February 21, April 18, 25, 1945 February	box 20	folder 44
<i>New York Herald Tribune</i> "Major Armstrong's Proposal" Regarding FM Inventor Offers Profits To End Dispute," 1945 March	box 20	folder 45
FCC, Testimony Before the--Docket No. 6768 1945 August 1, 1945 August 1	box 20	folder 46
<i>Broadcasting</i> "Armstrong Attacks FCC Data on FM," 1945 November 19	box 20	folder 47
<i>New York Times</i> "FM Still Open To Study," Response to Jack Gould's "FM Growing Pains," 1945 November 23	box 20	folder 48
Coverage and Correspondence Regarding FM Briefs to FCC, 1946-1948	box 20	folder 49
FCC, Testimony Before the--Docket 6651 1954 January 18, 1954 January 18	box 20	folder 50
<i>Army Life</i> "Inventor Lauds Army Training," 1946 February	box 20	folder 51
Heinl News Service--"Major Armstrong Takes Exception to Mr. Jett's FM Statement," 1946 February 6	box 20	folder 52
Radio Manufacturers Association of Canada, Address Before the, At the Chateau Frontenac, Quebec City, PQ., 1946 May 31	box 20	folder 53

<i>New York Times</i> "FM, Production Underway Despite Delays,", 1946 June 19	box 20	folder 54
<i>Broadcasting</i> "Armstrong Challenges Shouse on FM,", 1946 July 1	box 20	folder 55
<i>Tide</i> "In Support of FM Radio,"--Includes Correspondence,, 1946 September 6	box 20	folder 56
<i>Broadcasting</i> "Armstrong Questions Cosgrove's Reason For August Decline in FM Set Output,", 1946 September 28	box 20	folder 57
<i>Broadcasting</i> "Armstrong Says Setmakers Behind Broadcasters on FM,", 1946 October 21	box 20	folder 58
<i>Printer's Ink</i> "Clarification From Major Armstrong," Regarding "NAB's Sessions Run Gamut of Radio Problems as Trammell Urges Higher,", 1946 November 29	box 20	folder 59
FCC--Docket No. 8487--Briefs, Statements and Correspondence, 1947	box 20	folder 60
Advertisement--"What's All This Talk About FM?", 1947 January-February	box 20	folder 61
Sub-Committee of the Senate Interstate and Foreign Commerce Committee, Testimony Before--S. 1333 1947 June 25, 1947 June 25	box 20	folder 62
International Communications Conference--Address to in Atlantic City, 1947 August 6	box 20	folder 63
NAB Address--"Some Ancient History of the Radio Art," in Atlantic City, 1947 September 17	box 20	folder 64
Frequency Modulation Association, Radio Address to, in Chicago, Illinois,, 1947 October 15	box 20	folder 65
Laval University Speech--Includes Original Notes, 1948	box 20	folder 66
RCA's Attempt to Hamper FM Development--Testimony Regarding, 1948 May 1	box 20	folder 67
"Radio Broadcasting-1922-Looking Backward"--Published in <i>Radio Craft</i> 1948 June	box 20	folder 68
Articles Regarding Controversy With Jolliffe on Discovery of Long Distance, Short Wave Propagation FM and Telephone,, 1948 July-September	box 20	folder 69
<i>Electronics Magazine</i> Remarks on Jim Day's "Serrasoid FM Modulator,", 1948 August 11	box 20	folder 70
"A Study of the Operating Characteristics of the Radio Detector and Its Place In Radio History"--Paper Read Before the Radio Club of America, Inc.--Includes Correspondence,, 1948 November 19	box 20	folder 71
Statement to Infringers of FM Patents, 1948 December 15	box 20	folder 72
<i>Sponsor Magazine</i> FM Discussion, 1949 June 20		

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"FM Broadcasting: Past, Present and Future"--Paid Statement in the <i>Radio and Television Retailing</i> 1949 August	box 20	folder 74
<i>Broadcasting</i> "Questions FM to Cuba," 1949 November	box 20	folder 75
FCC--Docket No. 9501--Memoranda For Amendment of Section 3.261 Governing Hours of Operation of FM Broadcast Stations,, 1949 December	box 20	folder 76
<i>New York Times</i> "Radio's Wave Band," 1950 March 18	box 20	folder 77
Advertisement--"The Position of FM-1950," <i>Radio and Television Retailing</i> 1950 July	box 20	folder 78
<i>Radio Daily</i> "Claims FM First," 1950 September 14	box 20	folder 79
<i>Electronics Magazine</i> "Backtalk," 1950 October	box 20	folder 80
<i>Proceedings of the Radio Club of America</i> "The Short Story of the First Trans-Atlantic Short Wave Message," 1950 October	box 20	folder 81
<i>Marconi Review</i> "Wrong Roads and Missed Chances-Some Ancient Radio History"--Address for Receipt of the Washington Award,, 1951 March <u>Physical Description:</u> (2 Folders)	box 20	folder 82-83
New York Herald Tribune Radio Coverage of the United Nations, 1951 March 7, 24, 1951 March <u>Physical Description:</u> (2 Folders)	box 20	folder 84
<i>New York Times</i> "Diplomacy on TV"--Includes Correspondence,, 1951 August 30	box 20	folder 85
<i>US Naval Institute Proceedings</i> "Wireless in Warfare"--Includes Correspondence,, 1952 January	box 20	folder 86
Letter to the <i>New York Times</i> Hearing in the <i>Journal of the Patent Office Society</i> Regarding Defining Inventions, 1953	box 20	folder 87
<i>Columbia Alumni News</i> "Just A Few Tons of Ice...," 1953 March	box 20	folder 88
Subcommittee of House Judiciary Committee, Testimony Before--H.R. 3534 1953 June 9-10, 1953 June 9-10 <u>Physical Description:</u> (2 Folders)	box 20	folder 89-90
Speech--"The Spirit of Discovery"--An Appreciation of the Work of Marconi, AIEE Convention--Includes Correspondence and Photographs,, 1953 June 15	box 20	folder 91
<i>New York Times</i> "Defining Inventions"--Includes Correspondence,, 1953 August 30	box 20	folder 92
News Release on System of Multiplex Transmission, 1953 March 17	box 20	folder 93

"Some Recent Developments in the Multiplexed Transmission of Frequency Modulated Broadcast Signals"--With John H. Bose,, 1953	box 20	folder 94
Discussion of Allen Paper, undated	box 20	folder 95
Draft Material for FM Paper With Handwritten Notes, Drawings and Diagrams--Includes Notes on Mentor Michael I. Pupin,, undated	box 20	folder 96

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Series III: Clippings, 1912-1954

Scope and Contents

Armstrong maintained clipping files on a variety of topics directly relating to his work. These materials appear to be organized as Armstrong left them. With the exception of the first box, the series is organized chronologically.

Title/Description	Instances	
General, 1941-1952	box 21	folder 1
Old Clippings of Possible Interest, 1935-1940	box 21	folder 2
Television, 1935-1939	box 21	folder 3
Multiplex System, 1939-1953 (photographs), 1939-1953	box 21	folder 4
Television, 1940-1945	box 21	folder 5
Television Advertisements, 1947-1950	box 21	folder 6
Foreign, 1950-1952	box 21	folder 7
Inventions, 1953	box 21	folder 8
UHF Television--Misleading Propaganda, circa, 1912-1934 <u>Physical Description:</u> (2 Folders)	box 21	folder 9-10
Armstrong Honeymoon Ad Radio on Palm Beach--Aeolian Hall Tower, 1923-1924	box 21	folder 11
General, 1931-1940 <u>Physical Description:</u> (2 Folders)	box 21	folder 12-13
Early FM Articles, 1935-1940	box 21	folder 14
RCA, 1940-1949 <u>Physical Description:</u> (2 Folders)	box 21	folder 15-16
Political, 1952-1953	box 21	folder 17
Allocations--Clippings for Lab File, 1946-1947	box 21	folder 18
General, 1934	box 21	folder 19-20

<u>Physical Description:</u> (2 Folders)		
FCC Hearing and Controversy Over Reallocation, 1944-1946	box 21	folder 21-23
<u>Physical Description:</u> (3 Folders)		
Extra Copies of Photostats, 1945	box 21	folder 24
General, 1921-1928	box 22	folder 1-9
<u>Physical Description:</u> (9 Folders)		
Magazine and Press Reports Regarding FM, 1935-1936	box 22	folder 10
General, 1938-1939	box 22	folder 11-16
<u>Physical Description:</u> (6 Folders)		
Special Press Clippings Regarding Bridgeport Demonstrations, 1939	box 22	folder 17
Dunlap's Articles in New York Times, 1940	box 22	folder 18
FCC Hearing--FM and Television, Status of Radio, 1940	box 22	folder 19
Social Notes, 1940	box 22	folder 20
Doubting Comments and Hostile Comments, 1940	box 22	folder 21
General, 1940 January-March	box 22	folder 22-26
<u>Physical Description:</u> (5 Folders)		
General, 1940 March-1941 February	box 23	folder 1-17
<u>Physical Description:</u> (17 Folders)		
Hostile and Doubting Comments, 1941	box 24	folder 1
Carter's "Static is Good Enough For Us", 1941	box 24	folder 2
General, 1941 March-December	box 24	folder 3-14
<u>Physical Description:</u> (12 Folders)		
Dubious Comments, 1942	box 24	folder 15
General, 1942 January-March , 1943, 1942 January-March, 1943	box 24	folder 16-23
<u>Physical Description:</u> (8 Folders)		
General, 1944 January-May	box 25	folder 1
Dubious Comments, 1944	box 25	folder 2
General, 1944 May-1945 December	box 25	folder 3-15
<u>Physical Description:</u> (13 Folders)		
FCC Hearing and Controversy Regarding High and Low Bands, 1945-1946	box 25	folder 16
General, 1946	box 25	folder 17
FCC Frequency Allocation Decision, Controversy, 1946		

Edwin H. Armstrong papers 4078687

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FM Delay, 1946	box 25	folder 19
Freedom of Speech, 1946	box 25	folder 20
Foreign, 1946	box 25	folder 21
Unique and General, 1946	box 25	folder 22
Petrillo and Union, 1946	box 25	folder 23
Programming, 1946	box 25	folder 24
Political, 1946	box 25	folder 25
Retailing, 1946	box 25	folder 26
Technical, 1946	box 25	folder 27
Television, 1946	box 25	folder 28-29
<u>Physical Description: (2 Folders)</u>		
Major Armstrong--Sketches and Speeches, 1947	box 26	folder 1
Other Personalities, 1947	box 26	folder 2
General Information Articles, 1947	box 26	folder 3
FCC Denny's Prediction, 1947 January	box 26	folder 4
Armstrong's Speech at Atlantic City--Accuses RCA of Retarding FM, 1947 September	box 26	folder 5
Petrillo and Union, 1947	box 26	folder 6
FCC and Senate Interstate Commerce Committee, 1947	box 26	folder 7
Delaying FM, 1947	box 26	folder 8
Freedom of Speech, 1947	box 26	folder 9
Hearing on Allocation of 44-50 Mc Band, 1947	box 26	folder 10
Retailing and Production, 1947	box 26	folder 11
Expansion and Predictions, 1947	box 26	folder 12
Promotion, 1947	box 26	folder 13
FM Stations, 1947	box 26	folder 14
Relaying and FM Networks, 1947	box 26	folder 15
Advertisements, 1947	box 26	folder 16
Television, 1947	box 26	folder 17
Programming, 1947	box 26	folder 18
Broadcasting Code, 1947	box 26	folder 19
FM Association, 1947	box 26	folder 20

National Association of Broadcasters, 1947	box 26	folder 21
Other Organizations, 1947	box 26	folder 22
Technical Developments, 1947	box 26	folder 23
Equipment, Description of, 1947	box 26	folder 24
Educational FM, 1947	box 26	folder 25
Other FM Uses, 1947	box 26	folder 26
Foreign Clippings, 1947	box 26	folder 27
Progress, Delay and Reports on FM, 1947-1948	box 26	folder 28
Armstrong, 1948	box 26	folder 29
FM Patent Suit--Armstrong vs. RCA, 1948	box 26	folder 30
AFM--Petrillo		
General, 1948	box 26	folder 31
With FM, 1948	box 26	folder 32
With Television, 1948	box 26	folder 33
Hearing by House Labor Committee Investigating Charge that AFM Holds Monopoly,, 1948	box 26	folder 34
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Congressional Activities, 1948	box 26	folder 36
Hearing of Lemke Bill Before House Interstate and Foreign Commerce Committee,, 1948	box 26	folder 37
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Radio Sets, 1948	box 26	folder 46
Promotion, 1948	box 26	folder 47
FM Equipment, 1948	box 26	folder 48
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Television--General, 1948	box 26	folder 56
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Hearing on Mayflower Ruling, 1948	box 27	folder 1
Hearing on 44-50 Band, 1948	box 27	folder 2
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Canada, 1948	box 27	folder 5
Continental Europe, 1948	box 27	folder 6
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Low Band FM--W2XMN, 1949	box 27	folder 15
Congressional Activities--Senate Committee on Interstate and Foreign Commerce,, 1949	box 27	folder 16
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Pertaining to FM, 1949	box 27	folder 18
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Foreign--General, 1949	box 27	folder 22
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England and the British Isles, 1949	box 27	folder 26
South Africa and Africa, 1949	box 27	folder 27
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Broadcasting--General, 1949	box 27	folder 30
Commercial, 1949	box 27	folder 31
Educational, 1949	box 27	folder 32
Experimental, 1949	box 27	folder 33
Programming, 1949	box 27	folder 34
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Scope and Contents

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Scope and Contents

Throughout the series there are folders which are filed by individual name. The majority are engineering publications, filed by author. Others contain legal statements, testimony, correspondence and memoranda.

Scope and Contents

There are also large sets of litigation files, which contain material relating to specific cases, generally filed by defendant. These files contain testimony, transcripts, abstracts, notes, disclosures, technical reports and papers, license agreements, articles, press releases, correspondence, legal memoranda, instruction manuals, exhibits and patent file wrappers. Large amounts of Armstrong's and relevant others original work including correspondence, diagrams, notes, testing data, photographs, notebooks, logbooks, and patent disclosures used in exhibits can be found under litigation files as well. The following organizations can be found amongst litigation; Admiral Corp., American Telephone & Telegraph, Co., Arvin Industries, Avco Corp., Bendix Radio and Aviation Corp., De Forest Radio and Telegraph Co., DuMont Laboratories, Emerson Radio, FADA Radio and Electric Co., Gilfillan Bros., Hoffman Radio Corp., Fred M. Link, Motorola, Inc., Packard-Bell Co., Philco Corp., Radio and Television, Inc., Radio Corp. of America and the National Broadcasting Corp., the Radio Craftsman, Inc., Sentinel Radio, Sylvania Electric Products, Inc. and Wells-Gardner and Co. The litigation files found within this series should be researched in conjunction with series five as the two overlap.

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Series V: Records of Cravath, Swaine and Moore and Other Legal Firms, 1901-1982

Scope and Contents

This series encompasses materials given to Columbia University by a variety of legal firms who had represented Armstrong and his wife, Marion, in litigation or estate matters. The bulk of the records came from Cravath, Swaine and Moore, Darby and Darby, Brumbaugh, Graves, Donohue and Raymond, and Pennie and Edmunds. These materials relate directly to the administration of the Edwin H. Armstrong estate, but many of Armstrong's original writings, disclosures, schematic drawings and notes can be found within this series, most prominently within the litigation files. Financial records for Armstrong's laboratories at Columbia University and at Alpine, New Jersey are included here as well.

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Series VI: Photographs, Negatives and Lantern Slides, 1886-1967

Scope and Contents

This series contains photographic media, arranged alphabetically. They are separated into two different types of materials; photographs with the negatives, followed by lantern slides. The series spans the course of Armstrong's life including childhood, military service in WWI, and his work in the Marcellus Hartley Laboratory at Columbia University. Images of the apparatus used in the development of regenerative circuit, the superheterodyne circuit and FM radio are also included. The FM-radio materials include the first tests of FM at the Empire State Building, Westhampton Beach, New York and Haddonfield, New Jersey, construction and operation of the first FM tower at Alpine, NJ, and the Yankee Network. Lantern slides that are duplicated in the photographs or negative are marked as "duplicate."

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