

Introduction: A Brief History of “The Whispering Gallery of the Skies”

“Science has made a whispering gallery of the skies,” declared Senator Henry F. Amherst as he marveled at the new technology called radio.¹ The evolution of radio began well over 120 years ago. It was not the invention of a single person but the evolution of a technology influenced by people, their environment, big business, and big government. Radio was the invention of pioneers who had engineering and entrepreneurial skills. It has a history of people interacting with people and their environments.

Radio Pioneers

The roots of radio broadcasting extend back to the Industrial Age, the last half of the nineteenth century. During the mid-1800s, the telegraph transmitted coded signals, providing the world’s first instantaneous news service. Once success with the telegraph had been achieved by Samuel Morse, the next step was to send voice messages. Alexander Graham Bell created the necessary technology when he invented the telephone. Bell completed his first successful voice transmissions by wire in 1874.²

The telegraph and the telephone were critical inventions in the history of American electronic communication. But the real challenge was to develop a method of sending coded and voice messages without wires. James Clerk Maxwell, a Scottish physicist, was the first to publish a theory that a spectrum of electromagnetic energy beyond visible light exists.³ In 1888, a German physicist named Heinrich Hertz proved Maxwell’s theory by demonstrating the existence of invisible electromagnetic waves in his laboratory.⁴ Hertz played an important part in the birth of wireless communication because he demonstrated that electromagnetic waves carry electrical energy. He didn’t envision radio as we know it today, but his experiments laid the groundwork for the next critical invention in radio history: the wireless telegraph. The technology for a device that would send coded messages without wires was developed by Guglielmo Marconi, an Italian inventor and entrepreneur.⁵ Marconi took Maxwell’s theories and Hertz’s lab experiments and

put them into practice. He created the first radio transmitter and receiver—devices that used the electromagnetic spectrum to send bursts of radio energy. In 1901, he succeeded in sending a wireless telegraph signal across the Atlantic Ocean.⁶

Marconi realized the commercial value of his inventions and established corporations to market them, first in Great Britain, then in the United States, Canada, and Italy. Shortly after his transatlantic transmissions, he began to build radiotelegraphy stations along the Atlantic coast of the United States with a primary purpose of ship-to-shore communication. The Marconi Companies developed quickly into a dominant force in maritime communication, a force that lasted until after World War I.

While Marconi was building his radiotelegraph empire, a Canadian scientist named Reginald Fessenden was experimenting with wireless voice transmission.⁷ Sending voice signals on the radio spectrum was a more complicated process than that of coded transmission. Fessenden had to develop a device that would generate a continuous radio wave. He also had to develop a method of modulating the human voice onto the radio wave so that it would carry the message to a receiver. Using a telephone microphone to modulate a continuous radio wave, Fessenden broadcast the first wireless voice transmission on Christmas Eve in 1906.⁸ His audience consisted primarily of radiotelegraph operators aboard ships off the Atlantic coast that evening. They were amazed to hear a human voice and even music in their headphones for the first time!

Two years after Fessenden made the first voice broadcast, another radio pioneer broadcast voice and music on radio waves. Lee de Forest's radio broadcasts came a bit later in history, but he utilized a revolutionary device called the audion.⁹ It was essentially a vacuum tube that used three electrodes to amplify electrical signals passing through it. This was a critical invention for broadcasting because earlier voice transmissions were quite weak and could only be heard faintly on headphones. De Forest's audion allowed signals to be amplified many times to a level that could be heard on a loudspeaker, a basic component of radio receivers designed for home listening.¹⁰

Radio Corporations

Radio in the first decade of the twentieth century was primarily used for point-to-point communication, as were the telegraph and telephone. It was a maritime ship-to-shore and ship-to-ship communications tool. The concept of broadcasting, using radio to communicate with the general public, had not yet emerged.

The significance of the radiotelegraph in ship-to-shore communication was dramatically demonstrated in 1912 when the *Titanic* struck an iceberg in the north Atlantic. Even though there was another ship near the *Titanic* that night, its wireless operator was not on duty to receive a distress call. By the time the call was received by other ships, it was too late. Nearly 1,500 people were drowned, and reports of the disaster focused the nation's attention on the potential power of radio. The *Titanic* disaster demonstrated the need for regulation of the radio spectrum. The *Radio Act of 1912* was the U.S. government's response to the disaster. Two years

earlier, the *Wireless Ship Act* had been passed, but it simply required large passenger ships to have radio equipment aboard. The new law also was designed for ship-to-shore wireless but required licensing of transmitters through the secretary of commerce. It also specified radio frequencies to be used, assigned call letters, and prioritized the transmission of distress signals. The *Radio Act of 1912* was the first comprehensive piece of legislation dealing with radio, but it would later prove to be inadequate as broadcasting emerged in the 1920s.¹¹

The corporations that would play major roles in developing broadcasting were in place at the turn of the century. These included General Electric (GE), AT&T, Westinghouse,¹² and the Marconi Companies.¹³ Each of their companies held specific patents on radio components and had the financial resources necessary to make broadcasting a commercially viable medium.

As World War I approached, business and industry were nationalized and focused on war production. These changes affected radio as a business, and when the United States entered the war in 1917, all wireless stations were shut down. When they were signed on again, they were under the control of the navy. One of the most important results of the navy's controlling radio was the consolidation of patents. The corporations involved in producing radio parts held a variety of patents independent of one another. Marconi had attempted to build a global monopoly on radio by acquiring patents from competitors and holding strict control of his own. But the war effort forced manufacturers to pool their patents, allowing significant technological advances to be made during this time.

After the war, the navy, which was nervous about the control of radio by a foreign entity, namely, the Marconi Companies, proposed that radio communication remain under government control.¹⁴ But significant corporate pressure on the government resulted in wireless stations being returned to private ownership. The patent pool was released to the control of a new company: the Radio Corporation of America (RCA).¹⁵ Established in 1919, RCA was created to take over the holdings of the American Marconi Company. A young Marconi Company radiotelegraph operator named David Sarnoff would rise to the presidency of the new company.¹⁶

Under the new corporate agreement, GE would manufacture radio receivers and RCA would market them. AT&T would manufacture radio transmitters for use in the radiotelephone business. The remaining radio corporate player, Westinghouse, joined RCA along with its patents in 1921 in exchange for RCA stock. This ended the patent rivalries and established the corporate base for the emergence of a new radio industry: broadcasting.

As radio entered the 1920s, it was still primarily a wireless telegraph industry. However, the corporate partners of RCA were experimenting with radio stations that were designed to broadcast to the general public. Fessenden and de Forest made radio broadcasts to anyone who might have been listening but never established radio stations with regular program schedules. The stations generally cited as the first broadcasting stations were Westinghouse's KDKA, Pittsburgh, and CFCF, Montreal.

KDKA grew from the experiments of a Westinghouse engineer named Frank Conrad.¹⁷ In 1920, he began evening broadcasts from his garage. Rather than just talking, Conrad played phonograph records and was surprised to get music requests by letter from regular listeners. Conrad's broadcasts began to affect record sales and drew the attention of a local department store. The store began to market radio receivers to people who were interested in listening to Conrad's station and were happy to furnish more records for the programming. Soon, executives at Westinghouse saw the opportunity to sell receivers as well and licensed KDKA. The station's first official broadcast was coverage of the 1920 elections. Other pioneering stations have claimed to have been first, but according to Baudino and Kittross, KDKA is the oldest of the four claimants in the United States.¹⁸ Westinghouse and KDKA were the first to move decisively into commercial broadcasting, and KDKA was the first commercially licensed station in the United States.¹⁹

CFCF radio grew from experiments conducted by the Canadian Marconi Company. On May 20, 1920, before anything comparable had been heard in the United States, members of the Royal Society of Canada assembled to observe Canada's first wireless operation. It was the first public demonstration of commercial radio in Canada, marking CFCF's claim to the title "North America's oldest broadcasting station."²⁰ The results from this broadcast were immediate, as "people were lining up at the counters of electrical shops to buy home receivers." In the movie theaters where receiving equipment was on display, "these events drew larger billings than the motion picture."²¹

Many other radio stations followed KDKA's and CFCF's precedents, the most prominent being those established by the major companies: AT&T, RCA, and GE. These corporations each established key stations and were to play major roles in developing radio networks in the 1920s. The AT&T station, WEAf, was different from the others in its mission: It was operated as a "radio telephone booth" that could be used to send messages to the public for a toll.²² In this manner, WEAf sold the first radio advertising and aired the first radio commercials. AT&T considered the sale of radio time for "tolls" to be its exclusive right, and as a result, other radio stations did not sell airtime. AT&T also reserved the right to interconnect stations, so it is credited with another first in radio history: network broadcasting.

Network Broadcasting

AT&T's practice of selling airtime was widely criticized as too commercial for a public medium like radio. One of the critics was David Sarnoff, who proposed that radio should be supported by philanthropy like libraries and museums. Even some members of Congress were threatening legislation that would ban advertising on radio.²³ WEAf continued the practice, and by the end of the decade, selling radio advertising was accepted as the principal means of financing the industry.

At the same time, a corporate battle for control of the new radio broadcasting industry was growing. Within the structure of RCA, there were basically two groups: the Radio Group and the Telephone Group. The Radio Group, led by David Sarnoff, envisioned the radio medium as a source of information and entertainment

for the general public.²⁴ The Telephone Group, led by AT&T, considered broadcasting to be a “common carrier,” like the telephone. It was simply providing a medium for public use without providing programming. It soon became obvious, however, that if radio stations were going to attract listeners, entertaining programs would have to be offered.

The first weekly advertiser on WEAF was Browning King, a clothing manufacturer that sponsored a regular program of music featuring the “Browning King Orchestra.” The concept allowed advertisers to attach their company name to programs but did not include commercials promoting products. The radio commercials, as we know them today, would emerge later, but stations in the 1920s adopted AT&T’s sponsorship concept.

Now, AT&T, a government-regulated monopoly, found itself in the awkward position of programming a radio station and selling airtime. This position, seen by critics as a conflict of interest, would eventually lead to the withdrawal of AT&T from the broadcasting business. But not before AT&T established the first radio network. The company already had telephone lines across the country, so the interconnection of radio stations seemed a logical step. AT&T set up the first experimental connection between New York and Boston in 1923. By the next year, it had a regular network or “chain” of six stations established.

The Radio Group of RCA also wanted to establish its own network of stations. However, AT&T would not lease telephone lines to other networks; instead, David Sarnoff had to use Western Union telegraph lines to connect stations to his flagship station WJZ. The quality of the telegraph lines was not as good as the telephone lines, so Sarnoff’s network was at a disadvantage. This generated more criticism of AT&T, and by 1926, it gave in to pressure to get out of the broadcasting business. AT&T sold its flagship station, WEAF, and its network to David Sarnoff at RCA, but AT&T retained the rights to lease telephone lines for station and network interconnection, a practice that it continued for many years.

With the acquisition of the AT&T station and access to interconnection, David Sarnoff established a new network under the RCA umbrella: the National Broadcasting Company (NBC). The inaugural NBC broadcast aired across the country on November 15, 1926.²⁵ The next year, RCA divided NBC into two networks: NBC Red, the WEAF-based network purchased from AT&T, and NBC Blue, the original RCA network with WJZ as its flagship station. Although the two networks would become similar in size during the mid-1930s, NBC Red was the dominant network with the programming and advertising revenue developed by AT&T.²⁶

Competition for NBC was not long in coming. The United Independent Broadcasters (UIB) network debuted in 1927, the creation of a talent promoter and a music business manager. The network was intended to provide an alternative to NBC for music performers. After a major investment from the Columbia Phonograph Company, that company’s name was attached to the network’s name.²⁷ The phonograph company soon changed its mind about network ownership and sold its interest to one of the network’s major advertisers, William Paley. Paley, vice president of his father’s cigar company, negotiated for the right to retain the network

name, Columbia. He dropped the phonograph part, and it became the Columbia Broadcasting System (CBS) in 1928.²⁸

William Paley, an experienced businessman, started a campaign to build CBS affiliates to compete with NBC. Perhaps the most significant contribution Paley made to network broadcasting was the foundation of modern affiliate contracts. He offered affiliates a certain number of network program hours each week. These “sustaining” programs were offered free of charge to affiliates that he paid to broadcast “sponsored” programs. In exchange, the affiliates gave the network commercial time for network advertisers and an exclusive outlet for network programs. This affiliate contract was later adopted by NBC and remains the basis for network contracts today.

Other radio networks followed NBC and CBS. Some failed, but others were able to compete with the big two during the 1930s. The most significant of these was the Mutual Broadcasting System (MBS).²⁹ In contrast to NBC and CBS, Mutual was not developed from a flagship station and had no studios. It was a cooperative venture built around program sharing by a series of independent radio stations. The new network’s most famous program, *The Lone Ranger*, was introduced in 1933 on WXYZ, Detroit. MBS has survived to this day as a radio network, but never made the transition to television as did NBC, CBS, and the American Broadcasting Company (ABC).

ABC emerged in the 1940s after NBC was forced by a Federal Communications Commission (FCC) ruling to sell off one of its two networks.³⁰ After a court battle against the FCC rule prohibiting the operation of two or more simultaneous radio networks, NBC sold its weaker Blue Network in 1943. The new owner was Edward Noble, the Life Savers candy mogul, who changed the network name to ABC.

Radio Broadcasting Legislation

As more stations signed on the air during the 1920s, frequency interference became a major problem. The assignment of broadcast station frequency was still being made by the secretary of commerce under the *Radio Act of 1912*. As noted earlier, this radio act was designated for radiotelegraphy, point-to-point wireless communication. It was inadequate for the expanded frequency demands of commercial radio broadcasting.

By 1923, there were more than 500 radio stations licensed for broadcasting.³¹ The secretary of commerce was required to license radio stations under the act, but the legislation gave him little power to regulate frequency assignments. As a result, radio stations were interfering with each other, using the same frequency, changing frequencies, and varying their power levels. By 1926, interference problems and complaints to the secretary had increased dramatically. It was obvious that new legislation was needed. An opinion of the U.S. attorney general confirmed that fact.³²

The first legislation designed specifically for commercial radio was passed by Congress in 1927. The *Radio Act of 1927* recognized broadcasting as a distinct service apart from radiotelegraphy, and it established the “public interest, convenience, and necessity” standard for station licensing.³³ It created a temporary agency,

the Federal Radio Commission, to institute regulations and frequency assignments. Stations would be licensed for a period of three years and operate in the public interest. After one year, the responsibility for radio regulation was to return to the secretary of commerce.

The Federal Radio Commission continued until 1934. That year, President Franklin D. Roosevelt recommended to Congress that new legislation was necessary to regulate both wireless and wired communication. The regulatory power of the Federal Radio Commission and the Interstate Commerce Commission would be combined in a new agency, the FCC. Much of the philosophical framework of the *Radio Act of 1927* was reenacted in the *Communications Act of 1934*. The public interest standard remained; public ownership of the airwaves, equitable distribution, license eligibility standards, First Amendment protection, and the right to challenge governmental regulations were all retained in the 1934 act. With a number of amendments accommodating growth, new technology, and a changing environment, the act served as the primary electronic media legislation until it was replaced by the *Telecommunications Act of 1996*.

Radio Programming

Programming on the early radio networks consisted primarily of music performed live in the studio by the networks' own orchestras. Large studios were designed for live music and musicians dressed in formal attire even though they could not be seen. In 1927, musical variety accounted for 30 percent; light music, 8 percent; and concert music, 39 percent of radio programming time, with the remainder devoted to news, sports, and other information programming.³⁴

As the country entered the Great Depression in the 1930s, network radio programming began to expand. Vaudeville performers who were forced out of work by the growth of movies found radio a good outlet for their talents. Their mix of music and comedy routines became the basis for network radio's variety programming. The first series to draw large audiences was *Amos 'n' Andy*, a program about a taxicab company in the ghetto. The African-American characters were played by white comedians Charles Correll and Freeman Gosden. Introduced on NBC in 1929, the program had become the top network show in the 1930s. The idea of white actors playing black characters was considered racist by some critics even at that time, but the program was so popular that it stopped traffic and even movies in progress when it aired. *Amos 'n' Andy* moved to CBS television in the 1950s with African-American actors.

Dramatic adaptations of stage plays on radio appeared in the early 1920s. The networks also developed their own series including mystery programs like *The Shadow* and *Lights Out* and weekly anthologies like *Lux Radio Theater*. Perhaps the most famous drama aired on a radio network was "War of the Worlds," Orson Welles's adaptation of H. G. Wells's Martian invasion of Earth story. The program, presented live on Halloween evening in 1938, caused a panic among listeners on the East Coast, where the Martians supposedly had landed.³⁵

Welles adapted the story for radio as live news coverage of an actual event. Even though listeners were informed several times during the program that it was not real, many listeners thought it was actually happening. Because listeners had come to rely on radio to bring them news of the faltering economy and the threat of war in Europe, many were emotionally charged and ready to believe newscasters. The producers of “War of the Worlds” and the radio networks in general were widely criticized by the public. The networks were warned by the FCC that such misleading programs were not to be broadcast in the future. Nevertheless, the program demonstrated the tremendous power of the networks in the late 1930s.

As drama and comedy grew on the networks, music programming declined. During the 1930s, the percentage of music programming on network evening schedules dropped drastically.³⁶ Mystery and adventure programs were generally scheduled during the evening, but the daytime hours offered a new type of radio program: the soap opera.³⁷ Two of the most popular soap operas on radio were *Helen Trent* and *Mary Noble, Backstage Wife*. Radio programming matured during the 1930s, a period that came to be known as “the Golden Age of Radio.”

Radio News Emerges

News and information programming during the 1920s and early 1930s consisted primarily of what today might be considered special event coverage: speeches, political debates, religious sermons, and celebrations. President Roosevelt used the radio for his famous *Fireside Chats* in which he projected an intimate personality that listeners came to trust during the Depression.³⁸

The NBC Blue Network initiated nightly newscasts with Lowell Thomas in 1930.³⁹ It was obvious that radio could offer something that newspapers could not: immediacy. Newspaper owners realized this and attempted to stall radio news by forcing the wire services to withhold news from radio networks and stations.⁴⁰

Under an agreement between radio networks and newspapers, a Press-Radio Bureau was established in 1933 to supply news to radio. Radio newscasts could not be scheduled until after the morning and evening papers had been distributed. News commentary was not included in the agreement, so radio network newscasters became news commentators. By 1935, one of the news wire services, United Press (UP), broke the agreement and began to distribute news to radio networks. The Associated Press and the International Press Service followed UP’s lead soon after, and the Press-Radio Bureau was dead by 1938.

Radio news matured during World War II.⁴¹ Radio had become a consumer medium during the Depression. Listeners had come to depend on radio for entertainment and, increasingly, news. Radio could bring news of a war across the sea into listeners’ living rooms with immediacy and drama. Among the most notable of the network newscasters during WWII was Edward R. Murrow, who reported from London on CBS.⁴² He brought listeners reports on the bombing of London complete with the sounds of the battlefield. For the first time, listeners actually heard the events of war unfolding live.⁴³ Radio brought listeners the first news of the bombing of Pearl Harbor and of America’s entry into the war in 1941.⁴⁴ World

War II marked the beginning of a new era in radio and television.⁴⁵ The foundations were laid in those news reports, “live” from the battlefield. Radio and television today continue to reflect those patterns.

Frequency Modulation: FM

During the 1930s, engineers (Farnsworth working for Farnsworth Radio and Television⁴⁶ and Zworykin working for RCA)⁴⁷ were already working on the technology for a new medium: television. Another engineer and friend of David Sarnoff, Edwin Howard Armstrong, had taken on one of the most difficult challenges of radio technology at the time: the elimination of static from the radio signal. Armstrong discovered a new method of modulating sound onto a radio wave by varying the frequency rather than the amplitude. This method of modulation, introduced in 1933, eliminated the static in the resulting radio signal, but it required an entirely new system of radio broadcasting with different transmitters and receivers.⁴⁸ This would not be acceptable to David Sarnoff and RCA.

Sarnoff told his friend Armstrong that he could not support FM as a replacement for AM (amplitude modulation). Rather, he saw it as a new technology that would enhance television sound. However, Armstrong persisted in his position that FM should replace AM radio. This was the beginning of a long and bitter battle between the two men for control of the new technology. Armstrong went ahead on his own with the development of FM radio on a network of stations on the East Coast. The FCC approved the commercial operation of FM stations in 1941.

Following WWII, David Sarnoff convinced the FCC to reassign FM to a different part of the spectrum. This delayed FM’s development. In 1945, FM was assigned to 88–108 megahertz (MHz), where it resides today. The move, at the time, meant that all of Armstrong’s FM stations and receivers would be obsolete. Thus, the initial interest in FM fostered by Armstrong’s stations began to wane. AM station owners did apply for FM frequencies, but most FM signals simply became simulcasts of AM stations. In the late 1940s, there was not enough demand for the higher quality of FM, and the industry excitement was being generated by television’s potential. Armstrong continued to fight for FM radio for the rest of his troubled life. He finally took his life in despair in 1954. He died not knowing that little more than a decade later FM would begin a rise to dominate radio broadcasting and threaten to eliminate AM.

Post-WWII

Radio broadcasting emerged from WWII at the peak of its popularity. By 1945, it had become the most popular medium for both entertainment and news. Network programs and their stars were well established, listenership was at an all-time high, and advertising support was plentiful. All of this was to change dramatically within the next decade. The changes were due to a new electronic medium that threatened the very future of radio: television.

Television technology had been introduced to the public by Farnsworth in 1934⁴⁹ at the Benjamin Franklin Institute and by RCA at the New York World's Fair in 1939,⁵⁰ but the U.S. entry into the war in 1941 brought a temporary halt to the development of television. Following the war, the networks renewed their efforts in TV development, and many predicted the death of radio at that time.

Beginning in the late 1940s, popular radio network programs began to make the transition to television. As radio network-program schedules diminished, local stations began to drop their network affiliations. The loss of network affiliation resulted in a significant drop in national advertisers. In fact, by 1958, the average radio station earned about half of the advertising income it had in 1948.⁵¹ Fortunately, radio station owners recognized the strengths of their medium and turned to more localized programming and advertising support.

Formats Emerge

The radio music program had originated in the 1920s on the *Grand Ole Opry* and later on *Your Hit Parade*.⁵² By the late 1940s, recorded music had become more prevalent on radio stations. Recorded music programs were relatively inexpensive to produce, and as a result, these programs were common on independent stations that could not depend on network programming. As network radio stations began to lose programming to television, they turned to recorded music to fill the gaps. Stations used announcers to introduce pieces of music and the "disc jockey" (DJ) was born.

Some station owners held on to the notion that they could still attract mass audiences, but most recognized that they would do better attracting segments of the radio audience with a particular style of music. This was the philosophy of radio formats or formulas: People watch television programs, but they listen to radio stations.

It was not until the advent of a new music style that format radio really emerged as a major programming force. In the early 1950s, new music was emerging that would take teenagers by storm: rock 'n' roll.⁵³ The term is thought to have been used first by Cleveland disc jockey Alan Freed, who was inspired by an old blues lyric, "My baby rocks me with a steady roll."⁵⁴ As radio stations came to depend more on music, the time was right for the new and popular form of music to develop on radio. Rock 'n' roll appeared on radio in the form of the first format: top 40. Two radio pioneers are usually credited with the creation of top 40: Todd Storz and Gordon McClendon. In Omaha, Nebraska, in the early 1950s, Storz saw the jukebox as the inspiration for a new format. He noticed that people tended to play the same popular songs over and over again. He wondered whether a radio station could be programmed in the same way: a rotation of the most popular songs repeated throughout the day. At about the same time, Gordon McClendon was beginning to program his Dallas radio station with a top-40 format. He also developed a rotation system for the music, but he added heavy on-air promotion and personalities to the mix. Disc jockeys on top-40 formats became an important part of the sound and, in fact, achieved celebrity status as a result. Not only was the timing right for radio and rock 'n' roll to come together, but the target audience for the format was the

teenager, a portion of the population that was growing rapidly. Teens flocked to rock 'n' roll music in droves and became devoted listeners to top-40 radio.

FM Finally Emerges

By 1960, it was clear the radio would survive—but not as a network-dominated medium serving mass audiences. Radio's future was in formats geared to localized target audiences. With the development of transistors, radio receivers had become more mobile and personalized. This was something that television could not offer, so radio receivers became more common in automobiles. With the success of the top-40 format, station owners were inspired to experiment with other formats designed for special segments of the population.

Much of the growth in format radio continued to be on AM stations up until the mid-1960s. Even though FM technology had been in existence since the 1930s, the demand for better sound quality on radio did not materialize until much later. By the middle of the 1960s, the FCC had recognized the need to foster the growth of FM radio. In 1961, the agency had approved stereo broadcasting on the FM band. By this time, the recording industry was offering stereophonic records, and music lovers were more interested in higher-quality recordings. Because FM already had an advantage of being static free, the availability of stereo sound made it even more attractive. Specialized formats, such as classical and easy-listening, began to appear on FM stations.

In 1962, the FCC placed a freeze on new AM applications because the AM portion of the electromagnetic spectrum was becoming saturated. This encouraged FM applications, but a third FCC ruling in the 1960s had the most significant effect on the growth of FM. In 1965, the FCC ruled that AM and FM station combinations (operated by the same owner) in cities of 100,000 or more population could not duplicate programming more than half of the broadcast day. Before this ruling, many of these stations had been simulcasting (duplicating the entire day) on the AM and FM bands. The new FCC ruling, requiring different programming for one of the stations for part of the day, encouraged the development of new formats on FM.

By 1966, nearly 50 percent of homes in the United States had FM radio receivers, and this would increase to 93 percent by 1975.⁵⁵ With the growth of FM stations came further experimentation with new radio formats. The improved sound quality of FM and stereo signals also encouraged new music formats. Contemporary music was expanding and changing in the 1960s as well. New music formats such as AOR (album-oriented rock) and progressive rock reflected these changes. In the AOR format, longer album cuts were played rather than the hits heard on the top 40, and DJ styles were more mellow. As more and varied music formats became available on FM, listeners began to shift away from AM stations. By the middle 1970s, FM radio's share of the audience had reached 40 percent. Even though AM radio still had the larger share of advertising dollars, the trend was clear: FM would surpass AM in music format audiences. AM station owners were already exploring different formats that would be competitive in the 1980s and beyond.

As the 1980s began, FM domination of radio markets was complete with more than 50 percent of the audience. FM stations now offered a variety of music formats geared to different demographic or population groups. FM stations programmed popular formats like top 40, AOR, adult contemporary, and oldies as well as “niche” formats like alternative, jazz, New Age, and classical. As AM stations lost listeners to FM, they turned to information formats like news, sports, and talk that did not require the signal quality of FM.

Radio in the 1990s

By the middle of the 1990s, there were nearly 12,000 radio stations on the air in the United States. The FM share of the audience had risen to about 75 percent, with nearly 60 percent listening exclusively to FM.⁵⁶ Contemporary radio is characterized by intense competition among stations for their fragment of the audience. The largest listener shares were held by adult contemporary stations, but that prize was taken by country stations in 1994. News/talk formats, particularly in large radio markets, have grown in popularity throughout the decade. Growth formats include urban contemporary, Spanish, modern rock, and jazz.

Another prominent current trend in contemporary radio is group ownership. The *Telecommunications Act of 1996* under Title II, Section 202, has removed ownership limits on radio stations owned by groups. This prompted a frenzy of station buying and selling, particularly in large radio markets. As of 1997, the largest radio station group owner was Chancellor/Capstar, which owned 325 stations across the country. Ownership limits for radio stations in one market or city were also raised. One individual or company can now own up to 8 radio stations in a single market (5 in one service, AM or FM). This means that group owners will try to control a format by buying all the country stations or adult contemporary stations in a market.

Radio networks have enjoyed a resurgence in the 1990s. Satellite networks now deliver 24-hour music and talk formats to radio stations all over the country. The networks have been particularly successful in medium and small radio markets where stations cannot afford expensive on-air and programming personnel. Satellites also will deliver national radio stations directly to the listener as the new millennium arrives. These stations will offer compact disc (CD)–quality, digital sound via satellite to your home or vehicle. But radio in the year 2000 and beyond will continue to build on its strengths as a local, mobile, and personal medium.

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Notes

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3. Andrew F. Inglis, *Behind the Tube: A History of Broadcasting Technology and Business* (Boston: Focal Press, 1990), p. 6.
4. Inglis, pp. 6–7. See also Erik Barnouw, *A Tower in Babel: A History of Broadcasting in the United States to 1933* (New York: Oxford University Press, 1966), pp. 9–11.
5. Degna Marconi, *My Father, Marconi* (New York: McGraw-Hill, 1962). See also Barnouw, *A Tower in Babel*, pp. 12–15; and Christopher H. Sterling and John M. Kittross, *Stay Tuned: A Concise History of American Broadcasting* (Belmont, Calif.: Wadsworth, 1990), pp. 25–27.
6. *New York Times*, December 15, 1901, pp. 1–2.
7. Helen Fessenden, *Fessenden: Builder of Tomorrows* (New York: Coward-McCann, 1940; reprint, with a new index, New York: Arno Press, 1974). See also Inglis, p. 49; Barnouw, pp. 19–21; and Sterling and Kittross, pp. 27–29.
8. Sterling and Kittross, pp. 33–34.
9. Lee de Forest, *Father of Radio: The Autobiography of Lee de Forest* (Chicago: Wilcox and Follett, 1950). See also Sterling and Kittross, pp. 33–34; Barnouw, *A Tower of Babel*, pp. 21–27; and Inglis, p. 13.
10. Sterling and Kittross, p. 29.
11. Public Law 264, 62nd Congress, August 13, 1912. See Frank J. Kahn, ed., *Documents of American Broadcasting* (Englewood Cliffs, N.J.: Prentice-Hall, latest edition).
12. Inglis, p. 55.
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