Ruling the Waves

CYCLES OF DISCOVERY, CHAOS, AND WEALTH
FROM THE COMPASS TO THE INTERNET

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Such amateur listening had existed since the earliest days of radio. Spurred by Marconi’s youthfulness and do-it-yourself spirit, enthusiasts had built their own crude equipment and formed radio clubs. They communicated with one another in an early form of electronic camaraderie and exchanged tips for various kinds of receiving equipment. Yet in the early days of the twentieth century, radioheads were still a relatively rare breed. The technology was just too difficult to master and the signals too uninteresting—just the dots and dashes of Morse code, sent through the ether with an often-deafening crash and buried in a mass of static.

As Fessenden and others perfected the transmission of continuous waves, however, radio moved rapidly toward a wider and less technical audience. Suddenly, there was a buzz of intelligible language in the ether: words and music that even a casual user could detect. The number of amateur enthusiasts exploded, igniting an instant community and even a gray market of sorts. The radio boys learned, for example, that bedsprings could be used as spark gaps and that a round Quaker Oats box made an excellent core for tuning coils. They figured out how to use crystal-based detectors and stolen telephone headsets and avidly shared these discoveries through a growing network of enthusiasts. Like cloistered birdwatchers, they kept logs of their reception and would listen for hours to the static of their homemade headphones, straining for some signal of a far-off transmission. They weren’t hearing much, just weather reports and shipping bulletins and occasionally bits of gossip flung out by other operators. But it was the thrill of discovery that ignited these listeners, the ability to pull a signal out of thin air and hear a voice wafted from hundreds of miles away. In the United States alone, one author estimated, there was an audience of “a hundred thousand boys” a night in 1912, hunched over homemade receivers and waiting for signals.41

This, then, was radio’s second wave of public excitement. Unlike the first, which Marconi rode, this second wave had little to do with technical glamour or the thrill of discovery. It wasn’t about the inventors who had enabled this phase, and it wasn’t linked to any commercial objective. It was instead a social breakthrough—a realization that the same technology could be applied to a completely different purpose, offering options that its creators had never even conceived. No longer just a naval tool or messaging device, radio had suddenly morphed into a medium of entertainment—something to be enjoyed, rather than just used.

Implicit in this transformation was a certain sense of destiny—a belief that radio was technologically determined to break the bonds of existing authority. Because the ether hovered above the grip of both businesses and governments, the prophets of radio insisted that there was no way to regulate it or profit from it, no way to own a radio wave or parse the air into manageable chunks. Radio, they cried, was destined to be free, open like space itself to all comers and unencumbered by traditional notions of property rights. It was democracy’s tool, bound to broadcast without constraints from either big business or big government. Which wasn’t at all how matters turned out.

The Business of Broadcasting

For roughly a decade, the radio boys lived comfortably with the wireless industry. The stations sent their messages; the boys listened in; and because technical experts had claimed that the ether was effectively infinite, no one really worried about the physical impact of their presence. As the number of users multiplied, however, and the boys began to talk as well as listen, it quickly became clear that the ether was not in fact infinite, and that congestion of the airwaves was a very real problem. By 1910, transmissions were increasingly tumbling into one another, canceling each other out, and raising a cacophony of voices around and on top of the signals. While the radio boys didn’t mind the chaos, the U.S. Navy and established wire companies did, and they blamed the young enthusiasts for creating this congestion. Naval fleets, critics reported, were unable to communicate with their headquarters due to “amateur clamor,” and amateurs had even impersonated naval officers in some cases, sending false orders over the airwaves and creating chaos

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at sea. One article published in 1910 warned, "The efficiency of a number of the coastal stations of the Navy has been cut in half because of the presence of dozens of small amateur stations." Another, less dramatically, complained, "They gossip about everything under the sun. They ask each other for the baseball or football scores, make appointments to meet the next day, compare their lessons. And they quarrel and talk back and forth by wireless in regular boy-fashion." The radio boys derived a kind of gleeful pleasure from such complaints, seeing them as evidence of technology's great potential to shift the balance of power closer to the side of the individual. But to naval officers and other government officials, the amateurs' intervention was infuriating and potentially dangerous.

For several years these arguments played out, pitting a large but disorganized group of amateurs against a small but powerful group of opponents. Congress, it appears, was relatively confused by the conflict, still unsure about the technology of radio or the possibility of controlling property rights upon it. As Massachusetts Senator Henry Cabot Lodge admitted, "Personally I confess I do not understand the questions involved and I certainly should not be willing to vote until I am fully informed." Representative Ernest W. Roberts of Massachusetts was even blunter, identifying the basic problem that confronted radio regulation and supporting, most likely by accident, the ideological position of the radio boys: "We have been brought up with the idea that the air was absolutely free to everyone." How, then, could interference be prevented?

48Reported in Harlow, Old Wires and New Waves, p. 469.
52Roberts, however, who chaired a congressional hearing on the regulation of wireless telegraphy in 1910, went on to argue that some kind of regulation was indeed necessary, since "the march of civilization" now demanded "some change of the old common law with regard to rights in the air." See "Wireless Telegraphy and Wireless Telephony," Hearings Before a Subcommittee of the Committee on Naval Affairs of the House of Representatives on H. J. Resolution 95 (Washington, D.C.: Government Printing Office, 1910), p. 4.

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Just as the issue appeared to be grinding to a standstill, however, a major event shook the wireless world—indeed the world in general. On April 14, 1912, the luxury liner Titanic hit an iceberg in the North Atlantic and sank. Of the 2,227 people on board, 1,522 died. Although the Titanic was fully outfitted with radio equipment, and although help eventually came from a ship, the Carpathia, that heard its distress call, radio had nevertheless played a role in the liner's disastrous plight. When the Titanic went down, other ships much closer than the Carpathia had failed to hear its call: one nearby wireless operator was asleep when the call came in; another passing ship was not equipped with radio equipment. Even the Carpathia received the emergency signal sheerly by accident, when its off-duty operator returned to his headset to check the time. After the Titanic sank, moreover, radio waves along the eastern seaboard were clogged with the calls of desperate friends and family, each struggling to determine what had happened in the frozen North Atlantic and whether their relatives had managed to survive. Wireless operators were overwhelmed by the frenzy, and congestion was so bad that false information was passed along. In the early hours after the disaster, two messages apparently crossed in the air: the question "Are all Titanic passengers safe?" and a completely unrelated message that stated "towing oil tank to Halifax." The crossed message—"all Titanic passengers safe. Towing to Halifax"—was subsequently reported in the press and then revealed to be false, leading to outrage by those who believed that their friends and family had been saved.

Suddenly, arcane disputes over radio congestion became a matter of international concern—a matter, indeed, of life and death. Bills that had languished for years before Congress were rushed swiftly back into session, where shaken representatives quickly signed them into law. In 1912, the U.S. government passed its first major piece of legislation regarding the radio industry. Aiming directly at the growing ranks of radio boys, the Radio Act of 1912 required that all wireless operators be licensed and that distress calls take priority over any other transmission.

53Earlier bills in 1910 and 1912 simply required ships of certain types to carry wireless equipment and operating personnel.
It also broke the radio spectrum into discrete chunks and required amateur operators to stay in a small and technically inferior spot. While they could listen to any frequencies, the amateurs could now transmit only along the "short wave" portion of the spectrum, using waves of two hundred meters or less.

On technical grounds, the Radio Act was not particularly harsh. It was a continuation in many ways of a legislative process unfurled as early as 1906, when the countries that met at the Second International Radio Conference split the radio spectrum into "commercial" and "government" spheres and required communication between ships at sea. It was also considerably more liberal than other radio legislation being passed at the time. Britain had already nationalized the Marconi ship-to-shore stations, and governments elsewhere had laid an early and exclusive claim to the radio spectrum. To the radio enthusiasts, though, it was a painful blow—the first step toward parsing out the ether and imposing regulation upon it. After 1912, the frontier world of radio was effectively foreclosed. Boys might still wander along its outer limits, but they couldn't lay claim to it anymore, or even consider it a wide-open space. Instead, radio in the United States became a space like any other, marked by lines of property and ruled, albeit lightly, by the federal government. This was the first phase of radio's regulation.

The second phase was grander and far more sweeping in its implications. During World War I, as we have seen, radio fell promptly into the military sphere and amateur experiments crashed to a halt. Many radio boys went into the service, where they honed their skills as operators and dreamed of returning to the private world of transmission. When they came home, these enthusiasts filled the airwaves once again, sticking to their prescribed frequencies but experimenting within these bounds. Taking advantage of the dramatic improvements in broadcast technology, radio stations cropped up across the country—home-grown affairs for the most part, transmitting weather reports and phonograph music.

And then, early in 1920, something remarkable hit the airwaves. Frank Conrad, an engineer at Westinghouse Electric's Pittsburgh plant, began to transmit music concerts. They weren't anything really new, just basic phonograph records sent across the airwaves. Because Conrad was a particularly well-qualified amateur, though, the quality of his broadcasts was better than most, and a larger and larger crowd began to listen to his program. Suddenly, people were calling Conrad, requesting that he play specific songs and even, in some cases, mailing their own phonograph records to him. The concerts became regular events, airing every Wednesday and Sunday night, and a local music store provided records in return for being mentioned on the air. Then a larger store began to link its own advertisements to the concerts, offering "approved radio receiving sets for listening to Dr. Conrad." Conrad himself was not in business. He was an amateur like all the others, tinkering with radio purely for his own enjoyment. But slowly, and without even his participation, business was building around him.

Soon, Harry P. Davis, a vice-president at Westinghouse, realized that Conrad might be on to something. If radio broadcasts could increase popular demand for radio sets, then Westinghouse, which had just begun to produce small crystal receivers, might be able to grow its sales on Dr. Conrad's back. Westinghouse thus built Conrad a dedicated studio and applied to the Department of Commerce for a special broadcasting license. On November 2, 1920, the new KDKA transmitted its first broadcast, revealing the results of that day's presidential election. It continued with daily broadcasts, of live music, news reports, and speeches. The impact was electrifying. Suddenly, radio's band of listeners swelled, taking in not just the mechanically inclined radioheads but people from all walks of life who were stunned by the ability to hear this sound from an invisible source. In a matter of months, radio flew from the arena of messages and communication to the world of song and entertainment. This at last was broadcasting—not because the technology was too flawed to prevent it, but because the technology was eminently suited to it.

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In 1921 and 1922, radio mania hit the United States. People flocked to department stores to purchase sets, and applications for broadcasting licenses flooded the Department of Commerce. Whole sectors of the economy began to suspect that radio would change their world forever: newspapers rushed to create broadcast versions of their news; universities scrambled to offer college courses “on the air”; and churches built radio towers to proclaim their word from on high. Westinghouse gleefully rode the tide, joining the RCA patent group (it had not been a member until this point) and launching two new stations, WJZ in Newark, New Jersey and WBO in Springfield, Massachusetts. From its perch in Pittsburgh, meanwhile, KDKA continued to broadcast an expanded schedule of news, music, and just plain talk. Now, though, it had a lot of company. By the end of 1922, there were 576 licensed radio broadcasters in the United States. Some of them were good, and many were skilled, but in the boom of broadcasting that was underway, it didn’t really matter. Anything that went on air appeared to have an audience.

Once again, the language used to describe this boom was utopian and reverential. In the seven years between 1921 and 1928, one contemporary historian noted, “the popular use of radio spread as nothing before has ever spread, not only into every nook and cranny of the United States, but in growing waves all over the earth.” In this new era of intercommunication, he continued, “an entire nation has come to the point of absorbing some new thing into its life, a thing that will henceforth play a profounder part in its environment than it can guess.” Radio Broadcast, a publication launched in 1922, predicted that in the age of radio, “the government will be a living thing to its citizens instead of an abstract and unseen force... elected representatives will not be able to evade their responsibility to those who put them in office.”

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would go on to found Time magazine the following year, was particularly philosophical, proclaiming in a 1922 address that:

In radio broadcasting we have a force, an instrumentality greater than any that has yet come to mankind... When you transmit the human voice into the home, when you can make the home attuned to what is going on in the rest of the world, you have tapped a new source of influence, a new source of pleasure and entertainment and culture: that the world thus far has not been able to provide with any known means of communications... I regard radio broadcasting as a sort of cleansing instrument for the mind, just as the bathtub is for the body. Now the broadcasting station makes possible, for the first time in the history of civilization, communications with hundreds and thousands and, perhaps, millions of people, simultaneously.

On the surface, all of this activity should have been a boon for the radio boys. It was a validation of their belief in popular radio and a tremendous opportunity to jump into a new market that they already knew so well. By the same token, the emergence of popular radio should have been a slap at RCA, since the company’s business model was based entirely on radio-as-communication rather than radio-as-entertainment. Indeed, RCA seemed to have missed the radio boom entirely: it had no radio station of its own and no apparent interest in broadcasting. “We had everything,” one GE executive recalled sheepishly, “but the idea.” Yet as the market developed, it was RCA that rose to power and became the beacon of broadcasting in the United States. By 1930, amateur radio had all but disappeared from the world of broadcasting and the radio boys were gone.

51This figure is from Barnouw, A Tower in Babel, p. 104. Schubert (p. 214) gives the slightly lower figure of 508. For more on this growth and the chaos that ensued, see Jora Minasian, “The Political Economy of Broadcasting in the 1920’s,” Journal of Law and Economics 12 (October 1969), pp. 391–403.
53Cited in Barnouw, A Tower in Babel, pp. 102–03.
55Amateur radio itself remained, but the enthusiasts moved out of the broadcast field and back into communications, where they focused on “short waves,” or waves below two hundred meters. See Clinton B. DeSoto, 200 Meters and Down: The Story of Amateur Radio (West Hartford, Conn.: The American Radio Relay League, Inc., 1936).
56Quoted in Bilby, The General, pp. 64–65.
Chaos, Sarnoff, and NBC

Under the law of 1912, the U.S. Secretary of Commerce had no power to deny a radio license or enforce the use of a particular wavelength. He simply assigned wavelengths to those who applied for them, trying only to minimize interference and keep all tiers of users in their assigned bands. When the new crop of broadcasters applied to Washington, Herbert Hoover, the Secretary at the time, had just handed them out, assigning the applicants to the somewhat arbitrary wavelength of 360 meters. As the number increased, he continued to arrange the smaller stations across the 360-meter spectrum, and pushed the larger ones to four hundred. Emphatically, the pro-business Hoover refused to limit the number of licenses, arguing that the spectrum was a national resource that could not be garnered by a select few. “You will recognize,” he stated in a 1924 interview, “that if anybody should be able to have the exclusive use of a certain wavelength, he would have a monopoly on that part of the ether. That cannot be permitted.”\[^56\] And thus, even when the number of applicants exceeded the available spectrum and congestion began to plague the ether, Hoover refused to restrict the number of licenses. Instead, he simply reapportioned the spectrum once again and clustered the growing broadcasters more tightly across it.

Eventually, though, the sheer mechanics of transmission caught up with Hoover’s system and brought matters to a technical and political impasse. The first spark occurred in 1926, when a desperate Chicago station jumped over to a Canadian frequency in order to expand its broadcasting space. Outraged, Hoover took the station to court and sued to have its license revoked. But the courts only reinforced what he and his associates had long suspected: because there was no formal regulatory structure in place, the Secretary of Commerce had no power to revoke licenses.\[^57\] In practice, it appeared, the airwaves were still free.


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Chaos ensued. One hundred fifty-five new stations jumped into the ether, pushing the total number of broadcasters above seven hundred. Existing stations abandoned their assigned frequencies for better ones and everyone started to broadcast louder and louder, hoping to drowned out their competitors in the din. It was a time of utter anarchy and no one expected it would last for long. But without a secure regulatory framework—without any rules for radio—it wasn’t clear just how the anarchy could be contained.

Meanwhile, RCA was struggling to define its own role in broadcasting. After the original merger, control of the company had gradually passed to David Sarnoff, a Russian immigrant who had risen steadily through the ranks of the American Marconi Company. Sarnoff was an unlikely corporate executive. He was poor, lacked a college degree, and—quite unusually for a prominent executive in his era—Jewish. But he was also brilliant, blessed with both a magnetic mind (honored, he would argue, by studying the Talmud from dawn to dusk as a child) and a keen intuition for the politics of business. Sarnoff had met Marconi in 1906 and had rapidly convinced the older man to take a serious interest in his career. He then devoted the same art of persuasion to Edward J. Nally, general manager of the American Marconi Company, who would go on to become the first president of RCA. Sarnoff also nurtured a legend that, as a young man of twenty-one, he had been the telegrapher who first caught word of the Titanic’s sinking and relayed it, tirelessly and accurately, across the eastern seaboard. As subsequent biographers have pointed out, the story is almost certainly inaccurate. Why would Wanamaker’s, the department store in New York that employed Sarnoff, have been a control point for telegraphs arriving across the North Atlantic? And why would Sarnoff have stayed at his post for the seventy-two hours that reports assign to him when there were plenty of other telegraph operators in New York? Yet Sarnoff clearly enjoyed the tale, and he never took pains to correct it.\[^58\]

Within RCA, Sarnoff became known for his tenacious intelligence and for an early commitment to broadcast radio. In 1915,
before RCA had even been created, he had written a memo to Nally, urging him to consider “a plan of development that would make radio a household utility in the same sense as the piano or phonograph.” At RCA, Sarnoff expanded upon his concept for a “Radio Music Box,” considering sports broadcasts and radio sales and pressing his ideas upon all who would listen. Once the launch of KDKA proved him right, Sarnoff was quick to exploit his vision and his enhanced position within the company. In 1921, he jolted to the top of RCA, determined to push the giant company into the emerging world of broadcasting.

It wasn’t entirely easy. On the one hand, RCA was perfectly positioned to enter broadcasting. It had, after all, nearly all of the patents that surrounded radio and, through its links with General Electric and Westinghouse, a virtual monopoly on the sale of radio equipment. On the other hand, though, radio mania had pushed thousands of amateurs into the manufacturing business. Radio stations were popping up like mushrooms, as were entrepreneurs who could turn out workable radio sets using common available components and a few key pieces that, under the patent arrangements, could still be produced by their original inventors for “amateur” use. To the radio boys, this was ecstasy, an opportunity at last to take their homespun devices directly to the air and to the market. But to Sarnoff, it was hell. As one writer described it: “A raggle-taggle mob of free enterprisers was running away with the business.” If RCA were to thrive in this new world of popular radio, Sarnoff had to find some way to eliminate the amateurs. At the same time, though, he also had to prevent his own partners—GE, Westinghouse, and AT&T—from storming into the radio market on their own and capturing either the production or broadcast side of the industry.

In 1923, RCA began to apply pressure on its distributors, urging them not to sell vacuum tubes as independent components. The company also brought suit against several small set makers, arguing that their sales constituted a violation of RCA’s patent rights. AT&T joined the fray as well, warning radio stations that any transmitters other than those made by the Western Electric Company (an AT&T subsidiary) constituted a violation of AT&T’s patent rights. At the same time, representatives of the music industry were also growing restless. While the rise of popular radio had vastly increased the reach of popular music, it had also, according to the American Society of Composers, Authors and Publishers, deprived musicians and composers of their fair reward. If radio stations were going to play music on the air, they should compensate the creators of this music. Eventually, with the weight of several court decisions behind them, ASCAP forced the radio stations to pay an annual license fee to broadcast any ASCAP-controlled music. While this practice applied across all stations, it obviously hit hardest at the amateurs, many of whom had launched their stations with virtually no cash behind them. It was to cover these costs that many radio stations turned to corporate sponsorship, beginning a trend that would eventually define the commercial model of radio.

All of these developments seemed poised to advance RCA’s position. But then, in 1923 and 1924, events moved sharply in the opposite direction. First AT&T, a powerful but restless member of the RCA alliance, gave evidence that it was about to put its own radio receiver on the market, competing directly with the GE and Westinghouse brands that RCA sold. This, according to RCA, would be a violation of the original patent agreement. It would also be financially devastating. Even worse news came just months later, when the Federal Trade Commission launched a formal investigation of the “radio trust,” claiming...
that RCA and its allies had "combined and conspired for the purpose of... restraining competition and creating a monopoly" in the radio industry. Which, of course, they had.

It looked as if RCA's power was about to crumble. But then, in a series of moves that would later win him volumes of adulation, Sarnoff managed to wrap the two crises together and turn them to RCA's advantage. First, he and the other top managers at RCA launched a full-scale assault on Washington. They went before Congress and met with the trade commissioners, arguing that RCA's patents had to be protected and that the company was in fact playing a vital role in keeping the budding radio industry organized and orderly. According to Sarnoff, radio was again dancing with anarchy. There were too many little stations; there was too much interference in ever-narrower bandwidths and too great a chance that radio might "smother in its own dissonance." Both publicly and in private, Sarnoff argued that there had to be some "disciplined superstructure" imposed upon the public airwaves, some way of rationalizing and coordinating what was increasingly seen as a public service. And RCA, he intimated, was in the best position to do this.

Meanwhile, the RCA allies flung themselves into a heated and intensely secretive round of negotiations, with AT&T pitted increasingly against the other members. On the table were a host of contentious issues, including whether AT&T could make radios, whether RCA could use telephone lines for radio transmission, and whether any of the partners was already violating their common patent agreement. Ultimately, matters grew so fierce that an independent arbitrator was brought in. Late in 1924 he rendered a sweeping judgment, arguing that AT&T had no right to manufacture radio sets or even to engage in radio broadcasting. Shocked, top managers at AT&T plotted a countermove, hiring one of the nation's most prominent lawyers to render an advisory opinion on the arbitrator's ruling. This second opinion was even more dramatic, indicating that the entire patent pooling agreement—the technical and economic foundation of RCA—was itself illegal. All of the partners realized the potential impact of this finding: if it ever leaked into the public realm, it would seriously damage all of the erstwhile allies and ensure a hostile, and potentially devastating, conclusion to the FTC investigation.

It was at this point that Sarnoff struck. Why not, he argued, split the contentious broadcasting piece away from the larger and more powerful firms? Why not make broadcasting self-supporting, divorced from the equipment manufacturers who might otherwise be found in restraint of trade? With this shift, AT&T could be kept permanently out of the radio business and the reconstituted RCA would be free from the antitrust allegations that were otherwise likely to haunt it.

In January of 1926 a new company was formed, owned 50 percent by RCA, 30 percent by General Electric, and 20 percent by Westinghouse. Grandly called the National Broadcasting Company, it made its first move in November, purchasing AT&T's leading radio station (the New York–based WEAF) for a startling $1 million. It was a high price, but WEAF was more than just a station. It was instead the beginnings of a network, the largest in a chain of stations that AT&T had originally hooked together, each nominally independent but drawing from the same base of programming and advertisement. The idea behind this network—an idea that NBC quickly copied and expanded—was straightforward. First, a network of stations was inherently more orderly and rational than a cacophony of competing broadcasters. Each station that joined the network would reduce the chaos a little more, furthering Sarnoff's vision of a well-mannered, publicly committed industry. Then, by pooling their programming—that is, by playing the same music, news, or featured entertainment—the stations could reduce their individual costs while still securing the most lavish and expensive programming. Or, as NBC stressed in its press release:

The purpose of [the] company will be to provide the best program available for broadcasting in the United States.

The National Broadcasting Company will not only broadcast these programs through station WEAF, but it will make them available to other broadcasting stations

Indeed, during this period, Sarnoff envisioned the radio network as a public institution of sorts, financed through a combination of public and private contributions rather than by advertising. For more on his original notion of network broadcasting, see Bilby, The General, pp. 68–71; and Archer, History of Radio to 1926, p. 343.
throughout the country so far as it may be practicable to do so, and they may desire to take them.

It is hoped that arrangements may be made so that every event of national importance may be broadcast widely throughout the United States.66

This, then, was the start of true network broadcasting in the United States. It was also the continuation of two common refrains in radio, echoes of the same connections that had built Marconi’s messaging company and the early RCA. First, like Marconi’s ships and RCA’s patents, NBC’s stations found power in numbers. By joining together around a central core, each piece became part of a network that was vastly more valuable than the sum of its parts. This was network economics long before the term was coined: using a common standard and common content to create critical mass for a new industry. Second, like its predecessors, NBC was cloaked at its birth in the language of national interest. Sarnoff wasn’t building an empire just to increase his own personal fortunes, he was bringing order to a critical but unruly industry. NBC wasn’t portrayed as an entertainment company, but as a voice of reason—a responsible means to channel education and information to an increasingly hungry mass audience. Clearly NBC stood to benefit from the role it would play in the burgeoning broadcast industry. But Sarnoff’s ability to link this role to a broader public mission gave the new company prestige, support—and power. And the fact that this all occurred under RCA’s auspices made it stronger still.

Regulation: The Radio Act of 1927

Meanwhile, the rest of the U.S. radio industry was rolling in the chaos that Herbert Hoover had unleashed. Once it became obvious that the government had precious little power to deny or even police radio licenses, stations simply jumped into the ether at whim. Many were stations in name only, often run by complete amateurs who shunned even the radio boys’ informal norms of behavior. In one infamous example, a California evangelist named Aimee Semple McPherson decided to run a small station from her local temple. With no knowledge of radio mechanics, she roamed all over the dial, broadcasting from whatever frequency she happened to stumble upon. When Hoover’s agents threatened to close her station, Sister Aimee wired the Secretary at once. “Please order your minions of Satan to leave my station alone,” she demanded. “You cannot expect the almighty to abide by your wave length nonsense. When I offer my prayers to him I must fit into His wave reception. Open this station at once.”67 And so it was. Sister Aimee agreed to find a competent engineer, and Hoover reopened her station.

Other broadcasters were less emphatic, but no less troublesome. Throughout the summer and fall of 1926 they poured onto the airwaves in raucous gangs, jumping across frequencies and “stealing” spaces that had already been allocated under Hoover’s old system. Quickly, all semblance of order broke down. In most metropolitan areas, where listeners could no longer even receive a consistent signal, sales of radio sets began a dismal slide. “Radio broadcasting,” notes one account, “was in danger of destroying itself by the mad scramble of selfish interests.”68

In the face of such chaos, the larger radio stations descended at last upon Congress. With no more reference to open markets or freedom of the airwaves, they begged legislators to play a more aggressive role in the radio industry: to stop the “wave jumpers” and “pirates” and to police a system of allocated frequencies. While there was a predictable amount of disagreement about the specifics of regulation, consensus—among the larger firms at least—was tight. As Hoover remarked, the radio industry by this point was “probably the only industry of the United States that [was] unanimously in favor of having itself regulated.”69 Between 1925 and 1927, eighteen bills for radio

68Archer, History of Radio to 1926, p. 370.
regulation were submitted to Congress, and even President Coolidge joined the chorus of supporters, arguing that "the whole service of this most important function has drifted into such chaos as seems likely, if not remedied, to destroy its great value." It was ironic in some ways—this roughshod industry beseeching the government to impose order upon it. But there it was. Just as congestion on the wires had forced the early telegraph companies to mend their feuds and coordinate their actions, so did congestion on the airwaves compel the radio broadcasters to establish rules and divide their terrain. The difference, though, was that the telegraph wires had clear owners and property rights, while the airwaves were intangible and, in theory at least, commonly owned. Without an established system of property rights, the firms had little choice but to turn back toward the state.

The law that emerged, the Radio Act of 1927, was a concrete reflection of these demands. First, in a sharp correction of the 1912 Act, it clearly made radio the province of the federal government and its regulatory powers: henceforth, the U.S. government would "maintain control over all channels," granting licenses for the use of channels "but not the ownership thereof." Thus there were property rights in the ether, but ownership lay strictly with the state. Second, the Act established a Federal Radio Commission (FRC), which, guided by standards of "public interest, convenience or necessity," was to oversee the administration of radio licenses. There was to be no censorship of radio broadcasts, with the exception of "obscene, indecent or profane language," and no licenses were to be granted to any party found guilty of monopoly.

In effect, the 1927 Act made radio a kind of regulated utility. It served a public purpose of some sort; it was subject to the usual concerns over decency and fair play; and it was to be ruled by a dedicated authority. There was no more mention of the inherent freedom of airwaves; no hint that the ether was infinite or uncontrolled. Rather, the 1927 Act pulled radio harshly back to earth, forestalling the dreams of the radio boys and carving the ether into manageable chunks of space. It also paved the way for commercial radio and left the airwaves wide open to the emerging power of NBC. For although the Act prohibited monopoly, it didn't restrict either chain stations or commercial advertising. It also made no specific provision for small-time stations or public interest broadcasting. As a result, the FRC during its formative years edged closer and closer to the side of network broadcasting. Or, as one leading political scientist commented in 1935: "While talking in terms of the public interest... the commission actually chose to further the ends of the commercial broadcasters." In the summer of 1927, the FRC reallocated all existing radio licenses. It then held hearings on 164 stations, asking them to demonstrate how "their continued operation would serve public interest, convenience, or necessity." Only eighty-one of these stations were eventually renewed, most with reduced broadcasting time and power. Many of the educational stations were eliminated in this process, or forced to share time with their commercial counterparts. Twenty-three educational stations thus disappeared in 1928, and another thirteen in 1929. The larger stations, by contrast, fared eminently well. Of the twenty-five channels "cleared" by the FRC for more efficient broadcasting, twenty-one were network stations. By 1929, as Table 3.1 indicates, NBC alone controlled sixty-nine stations.

71Public Law No. 632, 69th Congress, 2d session, 1927.