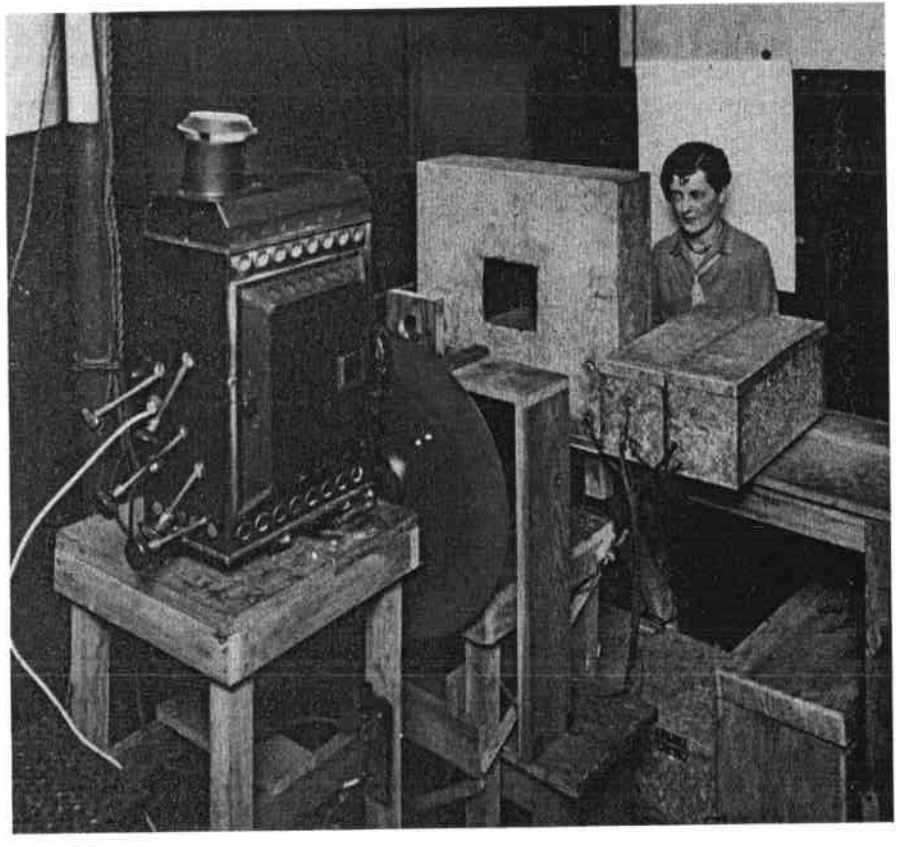
suggested to Secretary of the Navy Josephus Daniels that Congress be asked to approve a government charter, specifically authorizing a monopoly in radio. Daniels, though favoring the monopoly idea, doubted that Congress would be sympathetic. A different strategy was therefore adopted: the *fait accompli.* The issue would, if necessary, be faced some other day.

Perhaps soon. As the broadcasting fever spread, transmitter towers were shooting up throughout the country. Diverse receiving equipment appeared on store counters, and eager crowds lined up to buy. Television experimentation quickened. Behind all this was that old anarchic force, the "more than 100,000" amateurs championed by Hiram Percy Maxim, most of whom were back from military service. If they were aware that the RCA partners had divided up the electronic world, they showed no sign of it. They were going vigorously into action. RCA and its corporate owners felt their patents were being pillaged. They prepared for battle with the trouble-makers—even while battling each other. Chaos seemed likely, but one thing was clear. New levers of power were in the making.

TODDLER 2

"It is a wise father that knows his own child."

SHAKESPEARE



Scanner with "Nipkow disk"—as used by General Electric in experiments of 1920's. Smithsonian

The excitement that exploded in 1920 was a nationwide eruption, but activities in Pittsburgh were especially decisive.

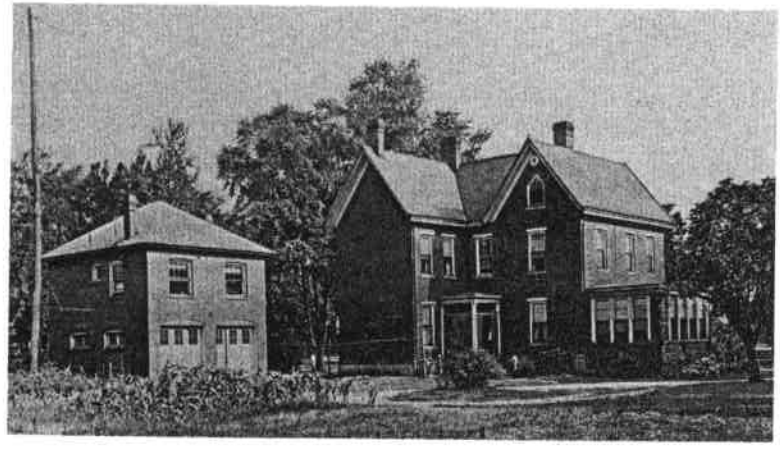
For the Westinghouse company, the halt in war production had created a bleak outlook. As government contracts for transmitters, receivers, and vacuum tubes ended, the company searched for ways to use its idled production equipment, but for a time found none. When its rival GE, by forming RCA, seemed set to take a dominant role in international communication, Westinghouse was not at first included in the venture. One Westinghouse researcher, Vladimir K. Zworykin, who had been a communication specialist in the Czarist army and had participated in television experiments in Russia, asked for permission to pursue these. Permission was given, but with reluctance; financial returns seemed remote.

A turn in the Westinghouse fortunes came from an unexpected quarter—the world of the amateur. Frank Conrad, a valued Westinghouse researcher, had been prominent in carrying out the government contracts: he had supervised manufacture of the SCR-69 and SCR-70, compact receivers made for the Signal Corps, as well as army and navy transmitters. After the war he had been transferred to making electrical switches. But Conrad was also a prewar

amateur; even as the radio work collapsed at Westinghouse, he unpacked his amateur gear and resumed his hobby. From a workshop over his garage in Wilkinsburg, outside Pittsburgh, he broadcast phonograph music and talked with other amateurs, using his old call letters 8XK. Thanks to his war contract work, he now had up-to-date vacuum tubes. Letters from other amateurs praised the quality of his transmissions, and sometimes requested particular musical numbers. Evening phonograph "concerts" from the Wilkinsburg garage became a regular feature—on Saturdays and sometimes weekdays. Conrad's sons Francis and Crawford and various friends began to participate. A newspaper item of May 2, 1920, mentioned a piano solo by Francis Conrad, for which a wire was stretched from the house to the garage so that the music could be "sent into the ether by the radiophone apparatus located there."

So far, the activity in Wilkinsburg was not new, nor unique. It followed prewar precedents set by De Forest and others, and similar activities were going on elsewhere. In Madison, Wisconsin, a group headed by Professor Earle M. Terry was broadcasting music and weather bulletins with the call letters 9XM. In Hollywood, electrical engineer Fred Christian had a 5-watt transmitter in his bedroom and entertained nearby amateurs with concerts, using the call letters 6ADZ. In Charlotte, North Carolina, contractor Fred M. Laxton had a transmitter in a chicken coop behind his home, with up-to-date equipment derived from wartime employment with General Electric; using the call letters 4XD, he too broadcast phonograph concerts. In Detroit William E. Scripps, Detroit *News* publisher, having begun as a home experimenter, decided in 1920 to move the activity to his office; in August his 8MK, following De Forest's example, broadcast primary election returns along with "radio-phone" concerts.

Many such experimenters knew each other, and listened and talked to each other. They formed a close brotherhood. But the following month a new element entered the situation.



Home and garage of Frank Conrad, site of 8XK—1920. NBC

THE AMATEURS

"Concert" preparations at 8MK, of Detroit *News*—1920.
Detroit Historical Museum

MERCHANDISING CONCEPT

In the Pittsburgh *Sun*, on September 29, 1920, the Joseph Horne department store ran an advertisement for a $10 item on sale in its basement. The advertisement used a news-story format:

> AIR CONCERT "PICKED UP" BY RADIO HERE
>
> Victrola music, played into the air over a wireless telephone, was "picked up" by listeners on the wireless receiving station which was recently installed here for patrons interested in wireless experiments. The concert was heard Thursday night about 10 o'clock, and continued 20 minutes. Two orchestra numbers, a piano solo—which rang particularly high and clear through the air—and a juvenile "talking piece" constituted the program.
>
> The music was from a Victrola pulled up close to the transmitter of a wireless telephone in the home of Frank Conrad, Penn and Peebles Avenues, Wilkinsburg. Mr. Conrad is a wireless enthusiast and "puts on" the wireless concerts periodically for the entertainment of the many people in this district who have wireless sets.
>
> Amateur Wireless Sets, made by the maker of the Set which is in operation in our store, are on sale here $10.00 up.
>
> —*West Basement*

The advertisement was seen by Harry P. Davis, Westinghouse vice president and Conrad's superior, and it gave him pause. Davis knew of Conrad's amateur activity and had never given it much thought, even when it received newspaper attention. But the advertisement, apparently reflecting a judgment on a merchandising value, had an entirely different effect on him.

The few hundred amateurs thought to be listening to Conrad's concerts in the Pittsburgh area were all technical-minded individuals who had themselves assembled their receivers. Since the turn of the century, receiving had been for those with technical knowledge. The practitioners themselves had woven a mystique around their activity, and surrounded it with arcane terminology. During the

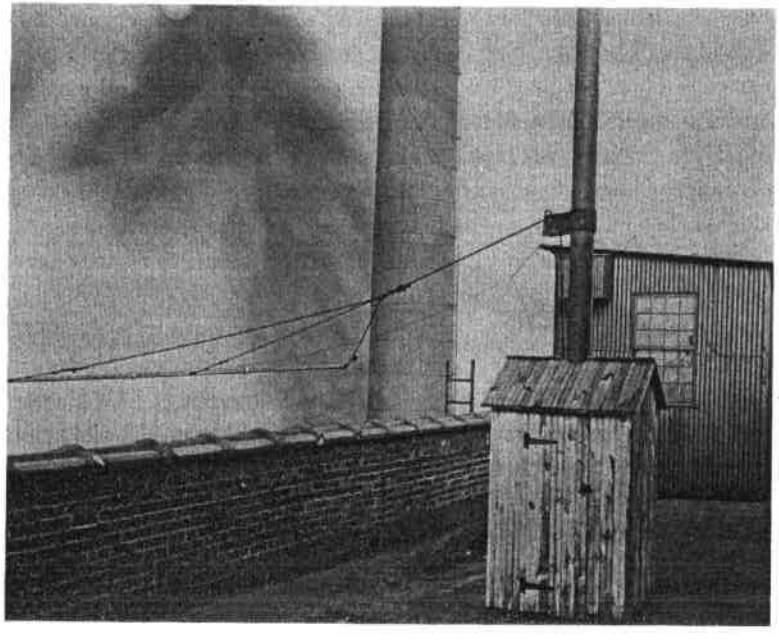
war the subject had become even more remote, mysterious, and legendary. But the Westinghouse receivers made for the Signal Corps, such as the SCR-70, were complete in one unit and easy to operate—on the insistence of the military. What suddenly dawned on Davis was the vision of a market—not of electrical wizards, nor of military forces, but of *everyone*. It seemed to him suddenly that this market might be virtually *limitless*, and that it could be activated merely by going on the air, and maintaining a regular program service.

The vision put the idea of broadcasting in an entirely new light. What had seemed an eccentric hobby, or a form of exhibitionism, or at best a quixotic enterprise pursued by visionaries like De Forest, was suddenly seen as a sound business concept that could yield rich profits through the sale of receivers.

On the very next day, September 30, Harry Davis conferred with Conrad. He wanted Conrad to build a transmitter at the Westinghouse works—like Conrad's 8XK, but stronger. Could Conrad have it ready by November 2, so that they could start a program schedule with maximum dramatic effect, via election returns? Conrad said he could.

On one of the taller buildings of the Westinghouse works in East Pittsburgh a shack was built, and a 100-watt transmitter assembled. An antenna ran from a steel pole on the roof to one of the powerhouse smokestacks. Throughout October the work went forward. On October 27 the U.S. Department of Commerce, which allocated licenses required by the radio law of 1912, assigned the call letters KDKA—commercial shore-station call letters. The Pittsburgh *Post* agreed to relay election information to the rooftop shack by telephone. From the shack Leo H. Rosenberg of the Westinghouse publicity department would broadcast the bulletins. A hand-wound phonograph was brought to the shack to fill periods between returns.

Westinghouse did not yet have complete sets in distribution, nor did other manufacturers. Equipment on sale at electrical stores

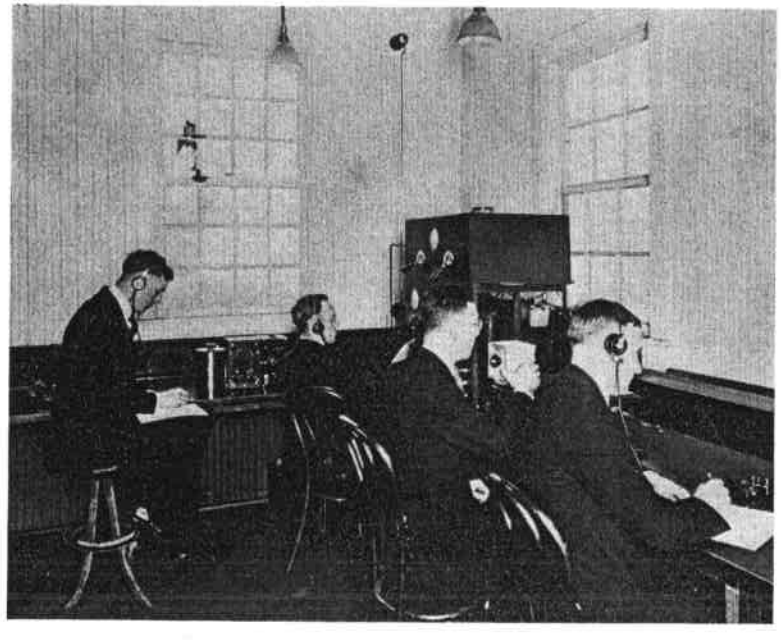


Rooftop shack, Westinghouse plant: first KDKA studio. NBC

consisted mainly of the assortment of parts from which amateurs assembled their tangled contraptions. Most of these still used crystal detectors. Westinghouse promised complete sets in the near future. Such sets were also on view for listening groups organized at the plant and at other locations including a country club.

In all publicity, Westinghouse stressed ease of operation. Radio was pictured as a coming social delight for everyone. The one-time preserve of scientific genius, and more recently the guarded domain of the military, was being opened to the masses.

Preparations were completed barely in time for the November 2 debut. Conrad's 8XK was available in case of transmitter trouble, but was not needed. Broadcasting began at 8 p.m. and went on until after midnight. By then it was clear that the Republican nominee

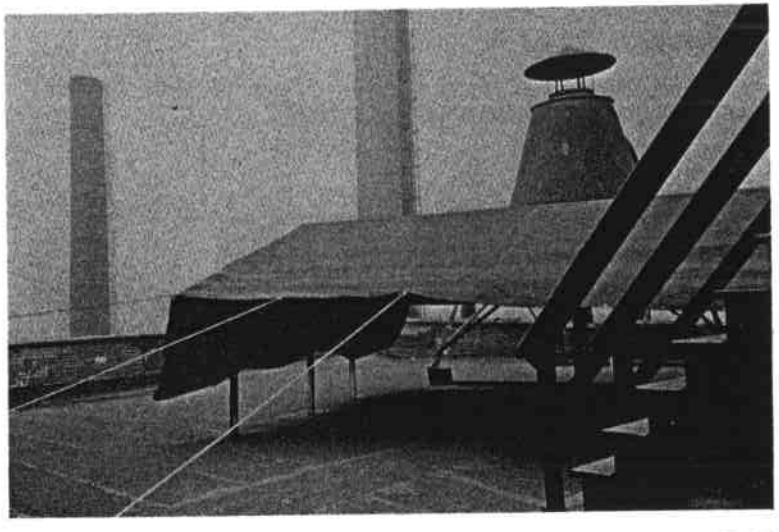


Shack interior: broadcasting the election returns, 1920. NBC

Warren G. Harding, U.S. Senator from Ohio, had been elected President, defeating James M. Cox. The listening groups appeared jubilant, both over the political turn and over their participation in a historic occasion.

It was significant in more ways than they could realize. The presidential contenders Harding and Cox were both newspaper publishers. Their nomination had symbolized the place of the press in the constellation of power—and also marked its zenith. KDKA was the start of a dislocation, the extent of which could scarcely be anticipated.

Skillfully promoted, the election broadcast received wide comment. But Westinghouse did not pause for self-congratulation. The broadcast was the start of a daily schedule, at first offering only an



Tent for orchestra, KDKA, Pittsburgh—1920. NBC

hour or so each evening—8:30-9:30—but soon expanding. This called for much improvisation, which was sometimes bizarre. A Westinghouse band was presented by wire from a hall, but the reverberation was unendurable on the air, so the next musical group was presented from the roof, where the acoustics were splendid. Rainy weather came, so a tent was built on the roof; the acoustics were still good. Then the tent blew down, and it was necessary to move indoors again. The acoustical problem was now solved by erecting the tent indoors. In time this arrangement gave way to studios hung with burlap—which often had a tent-like look.

In January 1921 KDKA tried a remote broadcast from the Pittsburgh Calvary Baptist Church, with engineers disguised in choir robes. Soon afterwards came pickups from a prizefight, a theater, and the Duquesne Club—for a speech by Secretary of Commerce Herbert Hoover.

Within weeks the 100-watt transmitter was replaced by a 500-watt transmitter, and similar transmitters were shipped elsewhere

Tent-like studio, WHK, Cleveland—*ca.* 1923. Smithsonian

to give birth to WJZ, Newark, N.J.; WBZ, Springfield, Mass.; and KYW, Chicago—all Westinghouse stations. Again, rooftop shacks served as temporary studios. At the Westinghouse plant in Newark, would-be broadcasters had to climb a vertical ladder, and were then hauled or pushed through a roof hatch. To end such indignities, a section of the ladies' "cloakroom" was partitioned to make a studio. In Chicago, the KYW 1921 schedule settled down to pickups from the Chicago Civic Opera, headed by Mary Garden. That winter all performances, afternoon and evening, six days a week, were broadcast.

These Westinghouse moves had rapid and numerous results. It was the KDKA debut that won for Westinghouse its invitation to join the RCA alliance, which thus became a GE-AT&T-United Fruit-Westinghouse partnership. It also changed the agenda for RCA. Broadcasting—and plans for the mass production and sale of receivers—suddenly won priority. At GE, researcher William C. White found himself "amazed at our blindness . . . we had every-

thing except the idea." He and others pushed plans for a General Electric station, and soon initiated WGY, Schenectady, followed by KGO, San Francisco, and KOA, Denver. RCA gave birth to WJY, Jersey City; later to WRC, Washington.

At RCA, the turn of events gave new impetus to the rise of David Sarnoff. Unlike most American Marconi holdovers, he had regarded the prewar broadcasts of De Forest with interest. As early as 1916 Sarnoff was urging American Marconi to manufacture "Radio Music Boxes," but the idea was rejected as harebrained by Edward J. Nally, general manager of American Marconi. Early in 1920, when the company had turned into RCA, Sarnoff mentioned the idea again, this time to Owen D. Young, and followed with a merchandising plan, including sales predictions which later turned out to be startlingly accurate. He estimated that Radio Music Boxes at $75 would sell as follows:

1st yr.	100,000 Radio Music Boxes	$ 7,500,000
2nd yr.	300,000 Radio Music Boxes	22,500,000
3rd yr.	600,000 Radio Music Boxes	45,000,000*

But in the spring of 1920 the RCA leaders were not ready to believe. Tangled in worldwide diplomacy, they considered the Sarnoff suggestion a digression. They allotted him $2,000 to develop a prototype of the Radio Music Box he had in mind. That got the matter off the agenda for the moment. Then the success of KDKA put it right back on. RCA had, in effect, missed the boat. Within weeks the national excitement was boiling in a way that could not be ignored. Early in 1921 the reorientation within RCA was under way. Sarnoff, aged thirty, was made general manager. Edward Nally, who had become RCA president, decided to retire; he was confused by the turn of events.

* In 1922, the first year in which RCA sold complete radio sets, its sales totaled about $11,000,000—substantially more than the prediction. For the second year Sarnoff's prediction was exactly right. For the third, sales ran to $50,000,000 or more than predicted.

Sarnoff was now RCA's most indispensable man. He knew everything about the company. At the very start of his career, as office boy, he had filed letters—and read each one, studying executive prose style. He carried a pocket dictionary and looked up unfamiliar words. Only he knew exactly who in the company did what, and what commitments had been made. He took night courses, improving himself. He hung around the company's experimental workshops. When Marconi visited the United States, Sarnoff managed to talk to the great man, and ran errands for him. Whenever there was a difficult job to do, Sarnoff volunteered to do it.

When the time came, in 1922, to choose a new RCA president to succeed Nally, Sarnoff was not considered. A president, in the view of board chairman Owen D. Young, had to have entree to government at its highest levels. It was no surprise when a general was chosen—Major General James G. Harbord, recommended by former Secretary of War Newton D. Baker. He represented a continuation of the military influence under which radio had grown, and under which RCA had been born. But there was no doubt who was in charge of domestic operations as the company faced the broadcasting era—including the inevitable coming of television. It was David Sarnoff.

In a way, the situation had the look of omnipotence. With two thousand patents, including all patents relating to the vacuum tube, the RCA group had a seemingly impregnable position. Yet there were loopholes, that now came to plague the life of David Sarnoff. Mostly, they concerned the "amateurs."

RAGGLE-TAGGLE MOB

Under agreements of the RCA allies, an effort had been made to allocate everything. The making of receivers and parts would be done by GE and Westinghouse; the marketing of these receivers and parts would be done through RCA under RCA trademarks.

RCA would assign 60 per cent of all manufacturing to GE, 40 per cent to Westinghouse. The sale of transmitters would be mainly an AT&T concern; they would be manufactured by its subsidiary Western Electric. Telephony as a service, or involving any business aspect, belonged to AT&T, whether wired or wireless. RCA had the chief role in international communication. Government orders were exempted from the provisions of these agreements; any of the companies could fill government contracts in any field. There were innumerable other provisos and reservations, but in general the radio world had been divided along these lines—*except for the amateurs.*

De Forest, in selling his patents, had kept the right to sell equipment to amateurs. The same reservation had been made by another experimenter, young Edwin H. Armstrong, who as a Columbia University student had invented important circuits, and had later sold patents to Westinghouse and RCA. At the time the reservations were made, they seemed unimportant. The RCA partners could also sell equipment to amateurs; the reserved rights had not been exclusive. But just who was an amateur?

In 1922, as the RCA group went into high gear with its manufacture and sales, Americans spent $60,000,000 on receiving equipment. But only $11,000,000 of this—less than a fifth—went to the RCA group. To be sure, it was an impressive sum, and it immediately made the broadcasting field the chief source of RCA income —exceeding marine and transoceanic communication, the original objectives of RCA. This strengthened Sarnoff's position in the company. Yet the RCA group was outraged over its small share of total sales.

What was happening was clear. All over the country "amateurs" were buying parts and putting sets together. Millions of people suddenly wanted sets, so the "amateurs"—gradually metamorphosing into business entrepreneurs—were selling them and getting more parts and making more sets. Throughout the United States, hundreds of workshops were assembling sets.

"Amateurs" were also making transmitters. In 1922 more than 500 stations rushed to the air. Many had begun as amateur operations—in many cases using parts sold by RCA for amateur use. The "amateurs" then decided to use the transmitters for regular broadcasting, and applied for new call letters and wave lengths. Thus 8MK became WWJ, Detroit; 9XM became WHA, Madison; 6ADZ became KNX, Hollywood; 9ZJ became WLK, Indianapolis; W9CNF became KWCR, Cedar Rapids; 9CT became WDAP, Chicago; 1XZ became WCN, Worcester. Amateur-made transmitters were suddenly leaving garages, attics, and chicken coops, and some of them were turning up on the roofs of newspapers, department stores, hotels, factories. These transmitters were not being used for amateur purposes but—said AT&T—for telephony as a service. Under the patent-pool agreements, the sale of transmitters for such purposes belonged exclusively to AT&T's subsidiary, Western Electric. Yet of the first 600 stations to reach the air, only 35 had bought Western Electric transmitters. AT&T was up in arms.

The radio boom, said Secretary of Commerce Herbert Hoover—whose office continued to be flooded with applications for broadcasting licenses—had been created by "the genius of the American boy." The RCA allies no doubt approved of the American boy, but resented his taking what they regarded as their business.

The carefully built alliance of the titans, dividing the universe, seemed to be crumbling. In the words of Lawrence Lessing, biographer of Edwin Armstrong, a "raggle-taggle mob of free enterprisers was running away with the business." At RCA the pressure was on Sarnoff, to crack down. It could not possibly be a popular job. But he was a company man, and went into battle.

In August 1922 an RCA patent policy committee, in a meeting attended by Sarnoff as general manager, recommended:

> That suits be brought . . . but that great pains be taken not to have a multiplicity of suits. Pains should, however, be taken to

> bring enough suits so that if one defendant goes out of business, time will not be lost.

RCA thus began a campaign to drive the upstart opposition out of business in an orderly manner.

But the troublemakers were no less indignant. They began to complain to their congressmen. The "radio trust" became a burning issue on Capitol Hill.

The public was scarcely aware of all this. It was trying, far into the night, to pick up Cleveland, Kansas City, Cincinnati, Denver, Detroit, Chicago. The mania mounted, even as the monopoly issue built up steam.

But if Sarnoff faced patent problems with hosts of small competitors, he faced even more formidable problems within the RCA group. An especially crucial issue was a 1922 innovation of AT&T, of large implications for television—the commercial.

COME INTO OUR PHONE BOOTH

When broadcasting began, it all seemed delightfully inexpensive. Talent budgets seemed unnecessary. Most broadcasters began with phonograph records; when they switched to live performers, it was because they came voluntarily, in droves. The main problem was to keep people in line.

At WWJ, Detroit, this was handled in 1922 by Edwin Tyson, a former forestry student who had somehow digressed into the radio boom. He lined up the performers in the WWJ reception room. They would tell Tyson what they could do. "We didn't rehearse them, we took their word for it." Tyson would take each into the studio, place him at the microphone, then return to the reception room to hear him on the loudspeaker—the only available monitor. If he seemed too loud or soft, Tyson would go in again to move the artist. After a suitable interval, he would rush a new artist in, and the other out. In this he was assisted by a former college football

player, Lawrence Holland, who worked at a Detroit gas station but came in the evening to help out, for the pleasure of it. He was a good bouncer when necessary.

At WJZ, Newark, it was the same way, though the studio was in a hard-to-reach factory. Artists from New York had to come by Hudson tube or across on the ferry. Yet the processions came—the famous, not-so-famous, and amateur. They included John Charles Thomas, Lydia Lipkowska, Percy Grainger, Olga Petrova, Eddie Cantor, Milton Cross—and countless others. Vincent Lopez brought his orchestra. It was a pilgrimage to a new kind of shrine. It was a moment in history all wanted to share and savor. No one asked to be paid. At KYW, Chicago, a full season of opera involved not a single payment.

But this could not last. The parade gradually slackened. Stations began to find they had a recruiting problem.

With this came other troubles. Broadcasters had used music freely, and they often read from newspapers, magazines and books without considering copyright problems. When ASCAP—the American Society of Composers, Authors and Publishers—began to ask for payment and in 1923 followed the demand with lawsuits, broadcasters were outraged. In the case of music, a copyright owner's control over performance rights was limited, under copyright law, to public performance "for profit." WOR, Newark, when sued by ASCAP, said it was not broadcasting for profit; it was offering a free cultural service. But its listeners were periodically reminded that this service was emanating "from L. Bamberger and Company, one of America's great stores." The announcements were bringing crowds of the curious to the store. In August 1923 a court decided that this was not a charitable enterprise, but indeed involved a profit purpose. Broadcasters, dismayed and angry, began to pay ASCAP annual license fees—starting at $250 per year but rising rapidly in later years. Holders of literary copyrights prepared to follow the ASCAP example. Broadcasters saw a very different future before them.

PILGRIMAGE TO
A NEW SHRINE

Lydia Lipkowska, court singer to former Czar, visits WJZ "cloakroom" studio in Westinghouse factory, Newark, N.J.
Thomas Cowan collection

A new, more elegant studio on ground floor of factory is ready for Olga Petrova.
Thomas Cowan collection

All this precipitated intense debate on how broadcasting might eventually be financed. *Radio Broadcast*, a monthly magazine launched in 1922, predicted that equipment manufacturers would not remain willing to bear the cost of broadcasting services after the radio-buying boom subsided. So "a different scheme" would have to be found.

The magazine published several suggestions. One was "endowment" of stations by wealthy donors, following the precedent set by Andrew Carnegie in his gifts to libraries. The idea was applauded, but brought no rush of philanthropists.*

Another suggestion was support by local governments. The magazine conceded this might seem socialistic, but felt the idea was nonetheless plausible, since such governments also financed schools and museums.

Another proposal—which won a prize as the best idea submitted—called for a tax on each set ($2 per tube, or 50¢ for a crystal set) to provide operating funds for a central broadcasting organization. David Sarnoff was said to favor a plan of this sort—not unlike the system Britain was adopting.

But meanwhile another plan was winning attention. Early in 1922 AT&T had resolved to take up broadcasting in a special way, which it considered appropriate to its experience and service. It used what seemed to many an odd terminology. An executive who participated in the original decision, Lloyd Espenschied, later described it in these terms:

> We, the telephone company, were to provide no programs. The public was to come in. Anyone who had a message for the world or wished to entertain was to come in and pay their money as they would upon coming into a telephone booth, address the world, and go out.

In keeping with the telephone imagery, AT&T called this "toll broadcasting." It also continued to speak of "radio telephony,"

* A possible exception was Colonel H. R. Green, an eccentric millionaire who in 1922 started WMAF, South Dartmouth, Mass., which broadcast from his estate. But it was operated as a hobby rather than a philanthropy.

probably for a strategic reason. Under the alliance agreements, telephony on a commercial basis was the exclusive province of AT&T. The new venture, AT&T was saying through its choice of words, was a form of commercial telephony and therefore reserved for AT&T and not open to GE, Westinghouse, or RCA. AT&T was laying the basis for such a claim, in case it was needed.

The AT&T plan envisioned a network of thirty-eight "toll" stations linked by the company's long lines. A New York station would be launched first.

The plan was made public in February 1922. "The American Telephone and Telegraph Company," the announcement said, "will provide no program of its own, but provide the channels through which anyone with whom it makes a contract can send out their own programs. . . . There have been many requests for such a service. . . ."

Reactions ranged from lukewarm to indignant. *Printers' Ink* predicted that many people would find the plan "positively offensive." At a Washington Radio Conference—the first of several, called to consider the cacophony in the ether as stations rushed to the air—there were unfriendly comments about the idea of "ether advertising." But there was no prolonged discussion; most people considered the idea impractical.

The following months seemed to confirm their view. Although AT&T had mentioned "many requests for such a service," more than a month went by before any customer applied for entry to the phone booth. By then it was clear that the plan had to be revised. AT&T had been determined *not* to produce programs. It wanted no more responsibility over content than it had in the case of phone calls. But sale of time to address the public was hardly feasible unless people were listening. Reluctantly, the company took up programming. First efforts involved intra-company talent recruitment. On the first evening program over WEAF, New York—which became the first "toll" station*—Helen Graves of the Long Lines

* WBAY, the original entry, had given technical trouble and was withdrawn. WEAF in later years was called WRCA and WNBC.

Plant Department sang "Just a Song at Twilight," and Edna Cunningham of the Long Lines Traffic Department recited James Whitcomb Riley's "An Old Sweetheart of Mine" and spoke of the value of effective speech. In following weeks the spotlight shifted to professional talent.

On August 28, 1922, at 5:00 p.m., WEAF finally broadcast its first income-producing program: a ten-minute message to the public from the Queensboro Corporation to promote the sale of apartments in Jackson Heights, on Long Island. An executive of the Queensboro Corporation spoke the message.

> . . . Let me enjoin you as you value your health and your hopes and your home happiness, get away from the solid masses of brick, where the meager opening admitting a slant of sunlight is mockingly called a light shaft, and where children grow up starved for a run over a patch of grass and the sight of a tree.
>
> Apartments in congested parts of the city have proven failures. The word neighbor is an expression of peculiar irony—a daily joke. . . .
>
> The fact is, however, that apartment homes on the tenant-ownership plan can be secured by . . .

During the following weeks the Queensboro Corporation broadcast four additional afternoon talks at $50 each and an evening talk at $100. Sales of apartments are said to have resulted.

The subject of the commercials had some significance. The 1920's saw an accelerated flight from the city. The rise of broadcasting, along with that of the automobile, was considered a factor in the trend. These had ended the sense of isolation once associated with life outside the city. According to *Country Life*—February 1922—radio had removed "the last objection to living in the country." In its first paid-for commercials, radio also helped to exploit the trend.

During August and September 1922 the total revenue from the radiotelephone booth was $550. Herculean selling efforts had brought slim results. Removal of the studio from the drab long-

Entertainment comes to the phone booth: Billy Jones and Ernie Hare–later known as the "Happiness Boys"–with WEAF hostess-accompanist Helen Hann, formerly of the AT&T Long Lines department. NBC

lines building at 24 Walker Street to the more prestigious AT&T headquarters at 195 Broadway seemed to help. An interior decorator was enlisted. The approach of Christmas also helped. The Macy, Gimbel, and Hearn department stores rented the phone booth.

January 1923 brought an electrifying breakthrough. Through arrangements made by an advertising agency, the cosmetic Miner-

alava sponsored a talk by actress Marion Davies on "How I Make Up for the Movies." An autographed photo of her was offered free to listeners, and brought mail in the hundreds. The news suddenly brought other advertising agencies and their clients: Goodrich, Eveready, Lucky Strike, Happiness Candy. The tide was rising.

Although Secretary of Commerce Herbert Hoover had been among those deprecating "ether advertising," the Department of Commerce now gave the venture a crucial boost. At the urging of leading broadcasters, Hoover was beginning to take charge of the broadcast spectrum, to establish order. While assigning wave lengths, he also placed limits on power and operating hours. In doing so, he gave WEAF favored treatment–a clear channel, free of interference over a large area, and maximum power. He had apparently accepted the AT&T argument that other stations were all special-interest stations, whereas a toll station was for "everyone."

AT&T had meanwhile begun to make spectacular use of its telephone lines. In October 1922 it had broadcast a pickup of a football game between Princeton and the University of Chicago via long-distance lines from Stagg Field in Chicago to WEAF in New York. In November a Harvard-Yale game had likewise been broadcast via long-distance lines. Phone links were also used for an opera broadcast from an armory; a series of organ recitals from the College of the City of New York; and a series from the stage of the Capitol Theater–inaugurating the broadcasting career of S. L. Rothapfel or "Roxy."

Requests for similar use of telephone lines by other broadcasters were rejected–including those from RCA, GE, and Westinghouse. They were told that the alliance agreements ruled out their use of such pickups. The rebuffed allies tried to use Western Union and Postal Telegraph lines for the same purpose; but their lines, never intended for voice transmission, proved painfully inadequate. AT&T was clearly in a position to freeze its allies out of an important area of programming.

AT&T, developing special cables, also began to pioneer in the linking of stations into a network. WCAP, Washington, second of the projected toll stations, was inaugurated in 1923 and linked by cable to WEAF, New York. To hasten formation of a large network for the sale of advertising, AT&T now "licensed" selected other stations to become toll stations. For this they had to buy Western Electric transmitters ($8,500-$10,500) and pay AT&T a license fee of $500 to $3000. This was widely considered a form of extortion, but the rewards—in advertising revenue and network programming—were persuasive.

By 1924 the AT&T schedule represented the aristocracy of broadcasting: the Browning King Orchestra, the Cliquot Club Eskimos, the Gold Dust Twins, the Ipana Troubadours, the A&P Gypsies. The excitement was kept boiling by new achievements: drama experiments by the *Eveready Hour;* news comments by H. V. Kaltenborn, editor of the Brooklyn *Eagle**; the opening of Congress, broadcast for the first time in 1923; the sensational, acrimonious Democratic national convention of 1924, which required 103 ballots before choosing John W. Davis as its presidential nominee; and finally, an election-eve broadcast by President Calvin Coolidge over a nationwide AT&T chain of stations—preliminary to a smashing reelection.

Throughout 1922-24 the vision of broadcasting as a force in virtually all aspects of society—the new concert hall, theater, classroom, pulpit, newsroom, political arena—propelled experimenters forward. The vision already extended itself to television. All the RCA allies were pushing laboratory work in television. So were individual inventors—among them Charles Francis Jenkins, who in the 1890's had contributed to the evolution of the motion picture projector. During 1923-24 his television experiments began to

* These were soon dropped under pressure from the U.S. State Department after Kaltenborn criticized Secretary of State Charles Evans Hughes for his uncompromising attitude toward the Soviet Union. Hughes told AT&T that a public utility should not be used for such purposes.

achieve results, approximately paralleling those of John L. Baird in England. Both Baird and Jenkins—in that order—made public demonstrations in 1925. Following in the path of Nipkow, both used rotating disks with spiral perforations to accomplish a rapid scanning process—as did Ernst F. W. Alexanderson, chief television experimenter at General Electric. The camera at one end, the receiver at the other, had such disks. Some experimenters felt that this mechanical system should be replaced by some electronic scanning method. Vladimir Zworykin, at Westinghouse, was among those working to this end, but the solution was not yet in sight.

Meanwhile the research and the rapid expansion were expensive. AT&T had found a lucrative scheme to finance the enterprise. But it was warning its patent allies that the scheme was the sole property of AT&T.

As RCA, GE, and Westinghouse contemplated the emerging, flickering image of television, they found the AT&T stand especially worrisome. Would sponsored television, too, be declared a phone booth of the air—and an exclusive AT&T preserve?

RCA, GE, and Westinghouse began to experiment with a modified form of sponsorship. The 1923 WJZ schedule included such items as the Rheingold Quartet, Schrafft's Tearoom Orchestra, and the Wanamaker Organ Concert. The sponsor did not pay for the time; it merely contributed the program. Nevertheless, AT&T protested the arrangement as a violation of the patent agreements.

While tension was building over this issue, RCA, GE, and Westinghouse got wind of what they considered a new outrage. During 1923 they learned that AT&T planned to market receivers, to be made by Western Electric. GE and Westinghouse had thought this was their exclusive domain, with RCA serving as their merchandising arm. Not so, said AT&T: receivers were an integral part of the telephone toll service it was developing. A receiver, like a telephone receiver, was just a part of the system.

To the others—the "radio group"—the claim was ominous. Did AT&T, while claiming the exclusive right to sell broadcast adver-

tising, now also intend to grab a share of their revenue from receivers—the only source of support for their own broadcasting activities? In the mounting antagonism between AT&T and its allies, this development was the last straw.

The patent agreements provided an arbitration machinery. All the allies considered it essential to arbitrate their differences in private, rather than air them in public. Early in 1924 the parties delivered preliminary statements to an agreed-on referee, Roland W. Boyden. Hearings began in utmost secrecy.

Meanwhile the disputants were startled by a bomb from Washington. The Federal Trade Commission, which had been studying monopoly complaints, issued a formal charge that the allies—AT&T, RCA, GE, Westinghouse, United Fruit, and subsidiaries—had "combined and conspired for the purpose of, and with the effect of, restraining competition and creating a monopoly in the manufacture, purchase, and sale in interstate commerce of radio devices . . . and in domestic and transoceanic communication and broadcasting." FTC hearings would look further into their agreements and competitive practices.

The FTC, like the public, seems to have been unaware of the behind-closed-doors arbitration in progress in New York, in which the division of empire was being reviewed. The behind-the-scenes drama remained secret until years later.

Much as the FTC action disturbed the allies, causing RCA to curtail its program of litigation, their own secret arbitration worried them even more. Here the status quo faced an imminent, decisive threat.

Both the FTC hearings and the arbitration were agonizingly deliberate. As the 1920's approached their mid-point, the broadcasting world was faced by converging crises—in courts, Congress, Federal Trade Commission, secret arbitration. From these crises a new structure in American broadcasting—for radio and television—began to emerge.

THE BIRTH OF NBC

Late in 1924 Referee Boyden sent a draft of his opinion to each of the disputants. As the "radio group"—RCA, GE, Westinghouse—read the draft, they could scarcely believe their eyes. Virtually all their contentions, even on minor issues, had been upheld. AT&T had been routed. Major General Harbord sent a jubilant radiogram to Owen D. Young, who was in Europe:

> DRAFT DECISION BOYDEN JUST RECEIVED STOP APPEARS SO FAR AS STUDIED TO GIVE US EXCLUSIVE RIGHT SALE RECEIVING SETS . . . RIGHT TO COLLECT TOLLS FOR BROADCASTING STOP

He followed with another:

> FURTHER STUDY BOYDEN DECISION SHOWS TELEPHONE GROUP HAS NO RIGHTS BROADCAST TRANSMISSION UNDER PATENTS RADIO GROUP STOP

Young, arriving back from Europe, saw it as a moment for diplomacy. Talks with AT&T could now produce a new and realistic allocation of spheres. The victorious radio group could afford to be generous, yielding a point or two.

But AT&T had a surprising, shattering weapon in its armory. It presented to the radio group an advisory memorandum by no less a person than John W. Davis, recent Democratic Party candidate for President. It said simply that if the patent agreements of 1919-21 meant what Referee Boyden said they meant, they were illegal in the first place—a conspiracy in restraint of trade, a violation of United States antitrust laws. AT&T could not, of course, contemplate an illegal course.

Nothing could have altered more stunningly the situation confronting the radio group. Since John W. Davis had helped draft the Clayton Act and was a former United States Solicitor-General, his words could not be lightly dismissed. Each side of the arbitration had bound itself to accept the referee's decision and not to take

"any proceedings intended either to modify it or set it aside," but how could AT&T be held to this?

AT&T had put its opponents (or allies) in a nerve-wracking predicament. If the quarrel were brought into open court, it would add fuel to FTC monopoly charges—enough to make a brilliant public bonfire. Moreover, AT&T would be aligned with government against RCA, GE, Westinghouse. AT&T had already put itself in position for such a move by selling its RCA stock and withdrawing from the RCA board. It could say—this was implicit in the John W. Davis memorandum—that it had not been aware of such illegality as the agreements proved "upon subsequent construction" to have.

There was an additional fascinating aspect to the memorandum. The patent agreements were still in effect, Davis advised—except for their illegal aspects. AT&T should continue to use the patents of the group. Only the illegal portions were not binding—those which allegedly forbade AT&T to enter available fields, such as the marketing of receivers, though its experience could "vastly benefit" the industry and the public.

In accordance with the plans of Owen D. Young, talks began—but under changed circumstances. There was now a quiet, dogged drive for solutions, amid utmost secrecy. Now came long, grueling explorations, digressions, deadlocks, confrontations, retreats, new beginnings. David Sarnoff, with his detailed knowledge of every phase of radio, moved gradually into a pivotal position.

AT&T's wish to market receivers and tubes had been a principal source of bitterness. Once it was conceded—with a royalty feature intended to limit production*—the talks began moving ahead. Curiously, the hard-fought-for right was to go almost unused by AT&T. Other prospects would take precedence.

During 1925 pieces began to fit together. Sarnoff, jotting down trading points, wrote:

* Sales over $5,000,000 in any one year would be subject to a 50 per cent royalty to the others of the patent group.

> Put all stations of all parties into a broadcasting company which can be made self-supporting and probably revenue-producing, the telephone company to furnish wires as needed.

Thus the future was seen in terms of "toll broadcasting" and a central broadcasting organization. Should this organization claim *exclusive* right to broadcast for tolls? Yes, thought Sarnoff at first. By all means, wrote A. G. Davis of General Electric, "insofar as the parties can give it that right."

In January 1926 the RCA board of directors approved the idea of the new company. It would be owned by RCA (50%), GE (30%), and Westinghouse (20%). Of course GE and Westinghouse would also have, indirectly, an ownership interest in the RCA share.

The new company would lease, under long-term contract, the AT&T web of wires. How much would their use be worth? It became clear that a chain spanning fifteen cities should plan to pay a telephone bill of at least $800,000 the first year, and that it would rise into millions as the chain grew. A ten-year contract was discussed.

The new company would buy WEAF from AT&T. For how much? AT&T suggested $2,500,000 but settled for $1,000,000—$200,000 for "physical facilities" plus $800,000 for "good will."

AT&T would discontinue WCAP, Washington; RCA's WRC would acquire its air time. Commerce Department policies presented no obstacle to this arrangement.

On July 7, 1926, twelve documents were signed. One was a service contract for the web of wires. The others readjusted the innumerable interrelationships between the allies. A new division of empire had been made.

AT&T was stepping out of active broadcasting, but on terms that would secure it a lucrative and steadily mounting revenue, with freedom from editorial troubles. It had its toll as it had originally wanted it—without content responsibility.

In September 1926 RCA in full-page advertisements proclaimed

the formation of the new company—the National Broadcasting Company. A divide had been crossed. The toll venture had been formally transferred to the national scene. The mantle of toll had fallen on NBC.

RCA's full-page newspaper announcement did not say this. Perhaps Owen D. Young and Major James G. Harbord, who jointly signed it, were unsure how the toll aspect would be received. The term "toll" would now be dropped from the vocabulary of broadcasting.*

The emphasis of the announcement was on other matters. Through NBC, events of national importance would be broadcast throughout the United States. The public would be assured of the best programming.

It was estimated that five million homes already had radios; twenty-one million homes remained to be supplied. If assured of highest quality programming, all would buy. Therefore RCA, as the world's largest distributor of radios, handling all those made by General Electric and Westinghouse, had the greatest stake in program quality. To that end this "instrument of public service" had been created. Thus the birth of NBC was explained in somewhat the same terms as the birth of KDKA.

By January 1927, NBC had two national networks in operation —a "red" network fed by WEAF and a "blue" network fed by WJZ.† The aristocracy of American business flocked to its banners, and began by sponsoring an array of concerts—the *Ampico Hour*, the *Atwater Kent Hour*, the *Cities Service Orchestra*, the *General Motors Family Party*, the *Palmolive Hour*. Decorum ruled: announcers wore tuxedos, and the music was classical or semi-classical. The lighter *Ipana Troubadours*, *Cliquot Club Eski-*

* "Toll" would return in the television years with an opposite meaning, that of audience-supported broadcasting.

† The terms "red" and "blue" developed from use of these colors in early network charts. The "blue" network eventually became the American Broadcasting Company.

mos, and *A&P Gypsies,* continuing from earlier days, were only slightly less decorous. Traditional culture also dominated drama offerings such as *Great Moments in History, Biblical Dramas,* and adaptations of classics on the *Eveready Hour.* During these early months, commercials on NBC were short and discreet. Mention of prices was forbidden, as too crass for network radio. This policy proved to be temporary, however.

NBC established an awesome Advisory Council of statesmen, churchmen, educators and others as guardians of the network's highest aspirations. A congressional committee was told that appeals could be made to this Council "over the heads of the operating executives." There is no evidence that this was ever done, but the Advisory Council added to the early aura of splendor surrounding the company.

During 1928-29 programming took a more earthy tone, especially in drama, which rose rapidly in prominence. A native hayseed vein was exploited in *Main Street Sketches, Real Folks,* and *Soconyland Sketches.* But the most sensational arrival, from the world of burnt-cork minstrel shows, was *Amos 'n' Andy,* written and performed by two white men, Freeman Fisher Gosden (Amos) and Charles J. Correll (Andy), and dealing with the "Fresh-Air Taxicab Company, Incorpulated." Word-distortion humor was a prominent element in the series. Sponsored by Pepsodent, the program became a legendary success—in later years, a racial issue. It also precipitated an avalanche of serials—*The Rise of the Goldbergs,** *Clara, Lu, and Em,* and scores of others. Beginning as evening programming, the serial soon became a daytime specialty.

The phenomenon of broadcasting, holding millions spellbound, was being compared to theater, film, and other entertainment. Yet its leading enterprise was something quite new in entertainment annals. Born of a military establishment, and still closely linked to it, it had now also acquired a special relationship to a wide spectrum of big business and its advertising agencies. No such constellation

* The title was later shortened to *The Goldbergs.*

had ever planned and controlled a nation's popular culture. Most programs were being produced by advertising agencies, as an activity parallel to the planning and designing of billboards and magazine advertisements. The network, having "sold" a period, seemed to regard it as sponsor property, to be used as he designated. Sponsors were, in effect, being encouraged to take charge of the air.

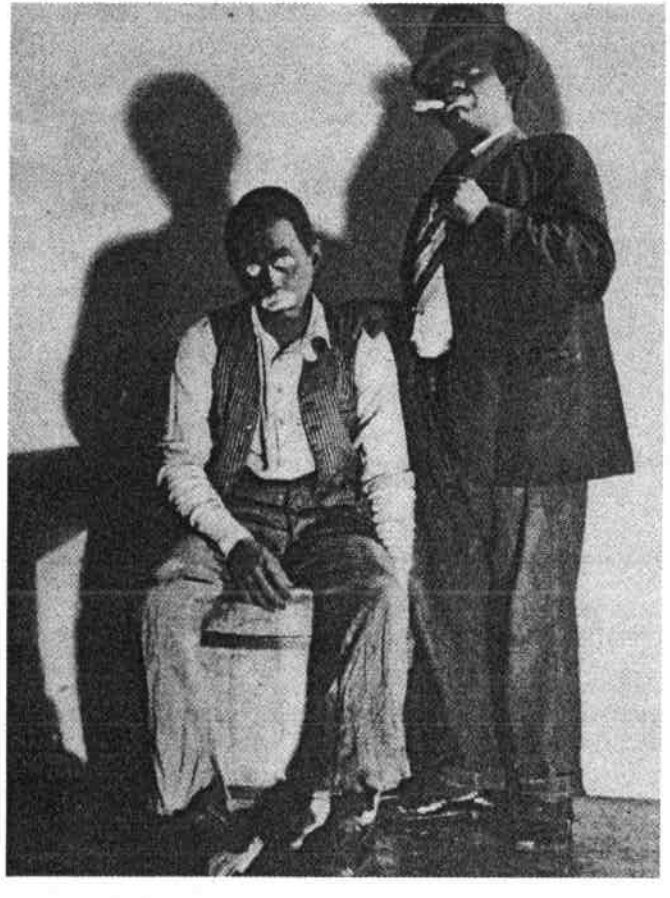
Whatever the ultimate implications of this might be, they were not in the minds of audiences. The birth of NBC had stimulated a flood of well-financed nationwide broadcasts, that were bringing diverse and welcome delights into the home, all free of charge. Most people were grateful, even excited. Amid general euphoria, NBC and its corporate owners seemed to face a rich future in radio and television—except for a few clouds that, momentarily, darkened the road ahead.

BUT NOT THE OWNERSHIP THEREOF

In 1926, in *United States* v. *Zenith,* the U.S. District Court for the Northern District of Illinois had decided that the Secretary of Commerce, in his efforts to bring order to the ether—by detailed stipulations and restrictions in station licenses—had exceeded his authority. The law of 1912 had not conferred such authority. The decision encouraged stations to move to more congenial wave lengths, increase their power, and extend their schedules. The result was an ether free-for-all, a fantastic jumble—and pleas to Congress to restore order. For the first time, said Secretary of Commerce Herbert Hoover, an industry was begging to be regulated. Within months Congress passed the Radio Act of 1927, and established a Federal Radio Commission to handle the licensing process. For RCA and NBC, and their owners and sponsors, it brought the peace they craved. Order was established—but at a price. Antimonopoly sentiment in Congress, the product of persistent agitation by RCA's competitors—the defeated and the struggling—was able

Freeman Fisher Gosden and Charles J. Correll, playing Amos and Andy.

to make its mark on the bill. The Radio Act of 1927 provided for the use of channels, "*but not the ownership thereof*," by licensees for limited periods; "*and no such license shall be construed to create any right, beyond the terms, conditions, and periods of the license.*" In the granting of a license or transfer of a station, the guiding



Publicity photo—"the boys in character"—for *Amos 'n' Andy*.

standard was to be the "*public interest, convenience or necessity.*" And every applicant for a license was to sign "*a waiver of any claim to the use of any particular frequency or wave length or of the ether as against the regulatory power of the United* States."

Hoover later spoke of pressures by broadcasters to support the

assignment of wave lengths as permanent property. The 1927 law repudiated this idea.

In another crucial clause, the Federal Radio Commission was forbidden to license "*any person, firm, company, or corporation, or any subsidiary thereof, which has been finally adjudged guilty by a Federal Court of unlawfully monopolizing or attempting unlawfully to monopolize, after this Act takes effect, radio communication, directly or indirectly, through the control of the manufacture or sale of radio apparatus, through exclusive traffic arrangements, or by any other means or to have been using unfair methods of competition.*"

Since the Federal Trade Commission was still pursuing its monopoly probe, this antitrust language put extreme pressure on the patent allies. The month in which the bill reached final form saw a loosening of RCA patent policy, with RCA agreeing to license a number of competitors, including recent "infringers," in return for a royalty based on sales. This seems to have brought a partial détente. In 1928 the FTC dropped its complaint.

While the law gave the Federal Radio Commission life-and-death power over licenses, it also put limits on the power. The commission was forbidden to act as censor. Its power was to be applied at license-renewal time, not in day-to-day decisions.

The industry had now arrived at a structure that would hold for years: a nationwide system based on advertising; a network linked by cables of the telephone system; stations on temporary licenses; a regulatory commission that was to base its decisions on the public interest, convenience, or necessity. This structure was to be the framework for the development of both radio and television.

Significantly, communication by *radio* was defined in the new Radio Act as "*any intelligence, message, signal, power, picture, or communication of any nature transferred by electrical energy from one point to another without the aid of any wire connecting the points. . . .*" Thus *radio* was intended to include television.

The stage was set for its first wavering steps.

FLICKERING SNAPSHOT

As peace came to the industry, television fever quickly spread. In 1927 Herbert Hoover, already considered a leading contender for the 1928 Republican presidential nomination, appeared in an experimental AT&T telecast. That same year the magazine *Television* appeared in New York, exerting a get-in-on-the-ground-floor appeal.* One of its advertisements said:

> I thought Radio was a Plaything
> But Now My Eyes Are Opened, And
> I'm Making Over $100 a Week.

In Schenectady, GE had moved from laboratory work under the inventor Ernst F. W. Alexanderson to program experiments. These were watched on experimental sets with a screen 4 inches wide, 3 inches high—the size of a file card or snapshot. On September 11, 1928, the tests included the first dramatic production, the melodrama *The Queen's Messenger*. The sound elements were broadcast by WGY, Schenectady; the picture by experimental television station W2XAD. Three cameras, all motionless, were in operation. Only close-ups were used.

Later the same group telecast a science-fiction drama, dramatizing a guided-missile attack on New York City. This imaginative production gave the viewer a missile-eye view of New York as the deadly weapon, electronically guided, approached its target. An aerial photo of New York, appearing on the television screen, came closer and closer and closer. Then an explosion, and the end of the drama.

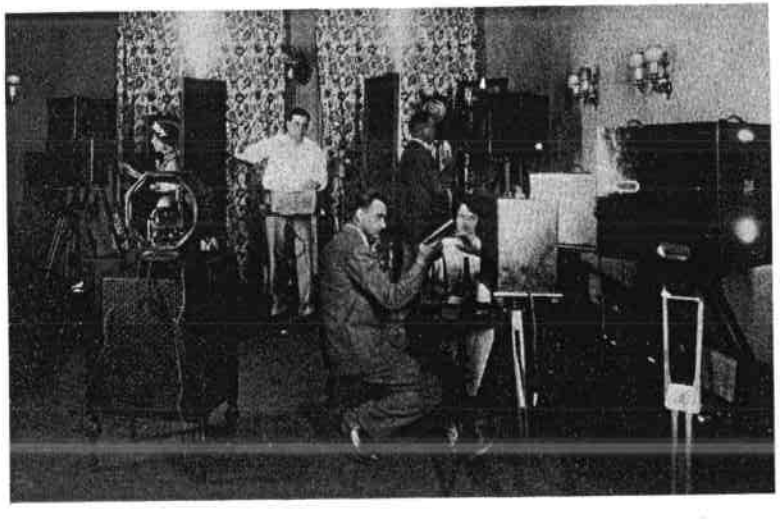
The telecast was seen by a British visitor from the Royal Air Force, who considered the program one of the most interesting

* A magazine of the same title appeared at about the same time in Britain, where the Baird demonstrations were fomenting a similar fever.

TV audience, 1928: researcher E. F. W. Alexanderson and family watch experiments at home on 3" x 4" screen. Smithsonian

GE PRESENTS

The Queen's Messenger, first drama venture, on W2XAD, Schenectady—1928. Rosaline Greene collection



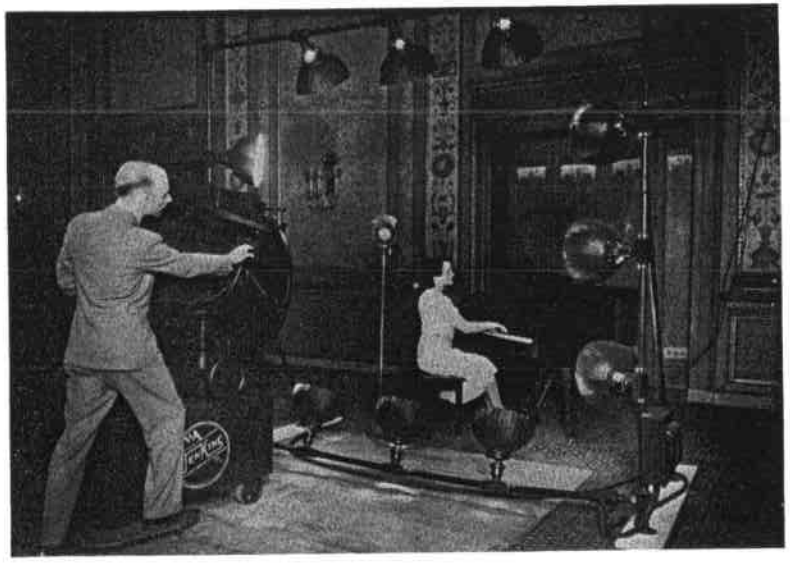
things he had seen in the United States "in its possibilities for future wars."

Following radio precedents, amateurs were assembling television sets and watching these experiments. As far away as Pittsburgh a veteran radio "ham," Edgar S. Love, picked up the Schenectady experiments. The mechanical nature of the system made such amateur participation feasible. The images were hazy—little more than silhouettes. But they seemed to augur a new epoch.

There were pressing reasons for intensified work on television. The success of the partly talking film *The Jazz Singer*—premiered by Warner Brothers October 6, 1927—made 1928 a year of upheaval in Hollywood. A vast changeover of theaters and studios was under way. Dramatists were frantically imported from the Broadway world. Stars with squeaky voices were set adrift. The mood of revolutionary change communicated itself to the broadcasting world. As film moved to sound, broadcasters reached for the image. The two industries had largely ignored each other, but now saw a convergence—or a clash—of interests.

In 1927 a competitor for NBC made a shaky appearance, against seemingly impossible odds—the Columbia Phonograph Broadcasting System, later Columbia Broadcasting System. Soon abandoned by its first backer, the Columbia Phonograph Record Company, the company had several hairbreadth escapes from bankruptcy, but survived. One of its crises was eased in 1929 when a new owner, the young cigar magnate William S. Paley, sold a 49 per cent interest to Paramount for $5,000,000 in Paramount stock. The deal at once strengthened the credit standing of the young network. For Paramount the dominant motive was the coming of television.

Meanwhile the tension between AT&T and RCA, so recently eased in radio, reappeared in a new arena. As the film world retooled for sound, AT&T's Western Electric, joining forces with Fox, gained acceptance of its sound-on-film system by much of the industry: Metro-Goldwyn-Mayer, Paramount, United Artists, Universal, and First National (soon afterwards taken over by War-



JENKINS PRESENTS

Programming at Jenkins experimental station W2XCD. Smithsonian

Jenkins receiver with round screen—1929. Smithsonian

ner Brothers). RCA and its principal owners, General Electric and Westinghouse, scrambled for pieces to pick up. Early in 1928 they formed RCA Photophone to exploit in film an old General Electric recording process, originally called Pallophotophone, developed during World War I and occasionally used in radio. To secure it a market they joined forces with the Keith-Albee-Orpheum theater chain and others to create—October 1928—Radio-Keith-Orpheum, or RKO. While equipping RKO theaters and studios, RCA Photophone also got its equipment accepted by Pathé (which was then taken over by RKO), Mack Sennett, and other lesser film companies. A vast interlocking was developing; in the struggle, many elements became valuable pawns. Music would rise in importance, so RCA bought two music-publishing companies, Leo Feist, Inc., and Carl Fischer, Inc. NBC's first president, Merlin Aylesworth, told a Senate committee: "It is necessary for us to be in the music business to protect ourselves . . . the movies have bought most of the music houses . . . we have got to control the music situation. It is a simple business proposition with a little touch of sentiment in it."

Amid these currents, the flickering image of television drew increasing attention. Within five years, said Sarnoff, television would be "as much a part of our life" as radio had become.

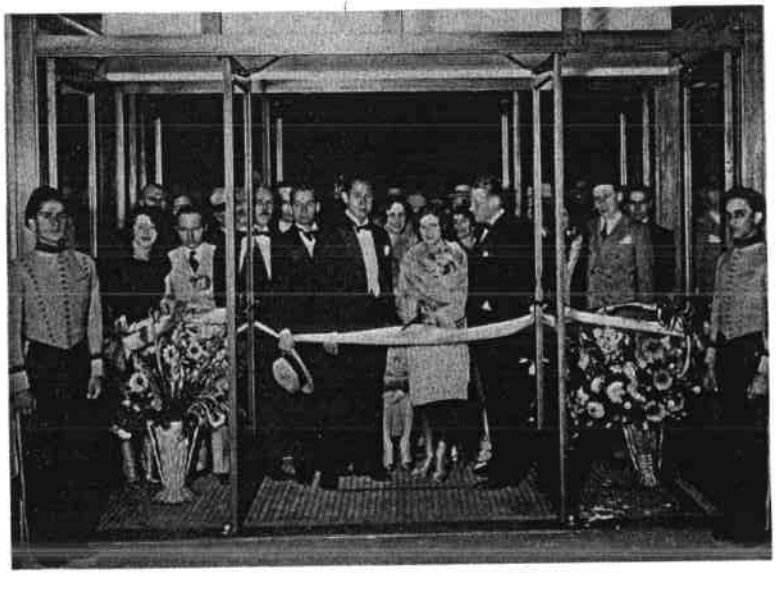
This time, his vision proved faulty. Surrounded by delirious optimism, Sarnoff could scarcely foresee the road-blocks and detours that lay ahead. In a way, they were a product of that very optimism. As every corporate maneuver seemed to promise boundless wealth, zooming stock prices reflected the expectations. Epitomizing the frenzy was the behavior of RCA stock.

Early in 1928 it stood at 85¼. Soon afterwards it began an astounding performance. On Saturday, March 3, RCA stood at 91½. On March 12 it *opened* at 107¾, closed at 120½. (Television rumors?) On March 12 it opened at 120½, closed at 138½. (Photophone news?) The next day it opened at 160—21½ points up. After a retreat, advance began again. By May it passed 200, then slipped

NEW NETWORK

Bing Crosby, factor in the growth of CBS. CBS

William S. Paley at ribbon-cutting ceremony for new CBS home at 485 Madison Avenue, New York—1929. CBS



early in June. By mid-June the skid stopped. (Hoover's nomination for President?) During the campaign the rise was resumed. ("We shall soon, with the help of God, be in sight of the day when poverty will be banished from this nation"—Hoover's broadcast acceptance.) In November RCA stock touched 400. (Electoral college vote: Herbert Hoover, 444; Alfred E. Smith, 87.) On December 7, a moment of panic: RCA slipped 72 points. But confidence rallied. After a period of ups and downs, RCA began another steep climb. (Dismissal of Federal Trade Commission complaint? RCA purchase of Victor? *Amos 'n' Andy?* Debut of Rudy Vallee?) In mid-summer 1929 RCA stock reached 500 and pushed beyond. The stock was split: each share became five shares, each of which, on September 3, stood at 101. It then edged up to 114¾. In eighteen months it had climbed about 600 per cent.

The feeling was that anybody who was anything would move to a suburban home with superheterodyne radio, television, air conditioning, and other things available on installments, with a place in Florida for later. Automobile and airplane had made this plausible. The stock market had made it seem inevitable. Radio had done its share in building the dream and inflating the credit bubble.

When it burst—"WALL STREET LAYS AN EGG," said *Variety*—RCA sagged to 20 within a month. Gradually paralysis took over the nation. During 1930 income and employment dropped catastrophically. Building almost stopped. The following year one in four factory workers was jobless. Breadlines stretched on and on. Innumerable projects were shelved. The flickering snapshot would not yet go to market.

For Sarnoff it was only a postponement. But his attention was also deflected to a new kind of crisis, one that threatened the very existence of RCA.

A BILL OF DIVORCEMENT

In 1930 David Sarnoff became president of RCA, while Major General Harbord moved up to chairman of the board. On the heels of these moves came jolting news.

In May 1930 the U.S. Department of Justice sued RCA, GE, Westinghouse, and AT&T. It demanded termination of the 1919-21 patent agreements and of interlocking ownerships and directorates. The renewed antitrust zeal was largely a product of the stock market crash, the Depression that had followed, and the business scandals they had brought to light.

To the broadcasting oligarchy, the move was beyond belief. The complex, closely knit setup had become an established way of life. But the Justice Department could not be dissuaded: to avoid trial, the companies would have to replace the patent agreements with an open patent pool, and untangle the corporate liaison.

A year went by. The problems seemed to defy solution. Owen D. Young wrote an eight-page letter to the Department of Justice calling attention to the "unprecedented economic and industrial crisis" of the nation. Much of this, he said, had been caused by "ruinous competition . . . destructive rivalry." He implied that the Justice Department demands would destroy what stability there was in the broadcasting field, and lead to further catastrophes.

The Justice Department stood firm. Late in 1931 AT&T, which no longer held RCA stock or board membership, made peace with the Justice Department by serving notice of withdrawal from the 1919-21 cross-licensing agreements. A number of the earliest patents, once so crucial, were in any case expiring.

For RCA, GE, and Westinghouse, with their symbiotic relationships, impending decisions were more perilous. And meanwhile business conditions worsened. In September 1931 Britain went off the gold standard, creating international shock-waves. In the United States, that same month, 305 banks closed; during the next month,

522 closed. Adding to the sense of international disintegration, Japan began overrunning Manchuria.

If the Justice Department antitrust suit were to go to trial and be lost by the defendants, the antimonopoly clauses of the Radio Act of 1927 would come into play. Broadcast licenses of incalculable value—KDKA, KGO, KOA, KYW, WBZ, WEAF, WGY, WJZ, WMAQ, WRC, WTAM, as well as experimental television licenses—would be imperiled. If the defendants had hopes of a more lenient political climate, the news of the moment dispelled them.

As 1932 began, most estimates of unemployment in the United States stood at ten million or more. People combed through city dumps. Bitterness increased. Farmers began to resist evictions with pitchforks and shotguns. In June the Republicans nominated Herbert Hoover for a second term as President. The Democrats nominated Franklin D. Roosevelt, Governor of New York. What was known of his views was not reassuring to executives of GE, Westinghouse, and RCA; many considered him to have socialistic tendencies. Against this background, representatives of the three companies pushed their divorce talks, to stave off trial. A date for trial was set: November 15, 1932, a week after election.

Among the negotiators was Owen D. Young, chairman of the board of GE, creator of RCA, member of innumerable boards and committees. He was world-famous as author of the Young Plan, an attempt to save Germany from economic collapse. Young was tired. A Westinghouse representative at the discussions, Walter C. Evans of KYW, Chicago, gives a vivid picture:

> I distinctly recall Mr. Young slouched down in an armchair in the RCA board room with the appearance of being more than half asleep. When the controversy reached a complete impasse his eyes would open only a slight amount and he would suggest the compromise which solved the question.

In this crisis David Sarnoff, with far-ranging grasp of detail and firmness for the RCA cause, emerged as a negotiator hardly less

skillful than Young. RCA had throughout its life been a sales agent for others, and owned by others; it had been, in spite of its prominence, a puppet organization. Its ability to survive would depend on dispositions now made.

Sarnoff hammered at a favorite theme: "Unification." The radio manufacturing facilities of GE and Westinghouse should be "unified," he urged, under RCA—with GE and Westinghouse being reimbursed via RCA debentures. As additional reimbursement GE would get real estate—an RCA-owned building on Lexington Avenue, New York City, which at the moment was losing money.

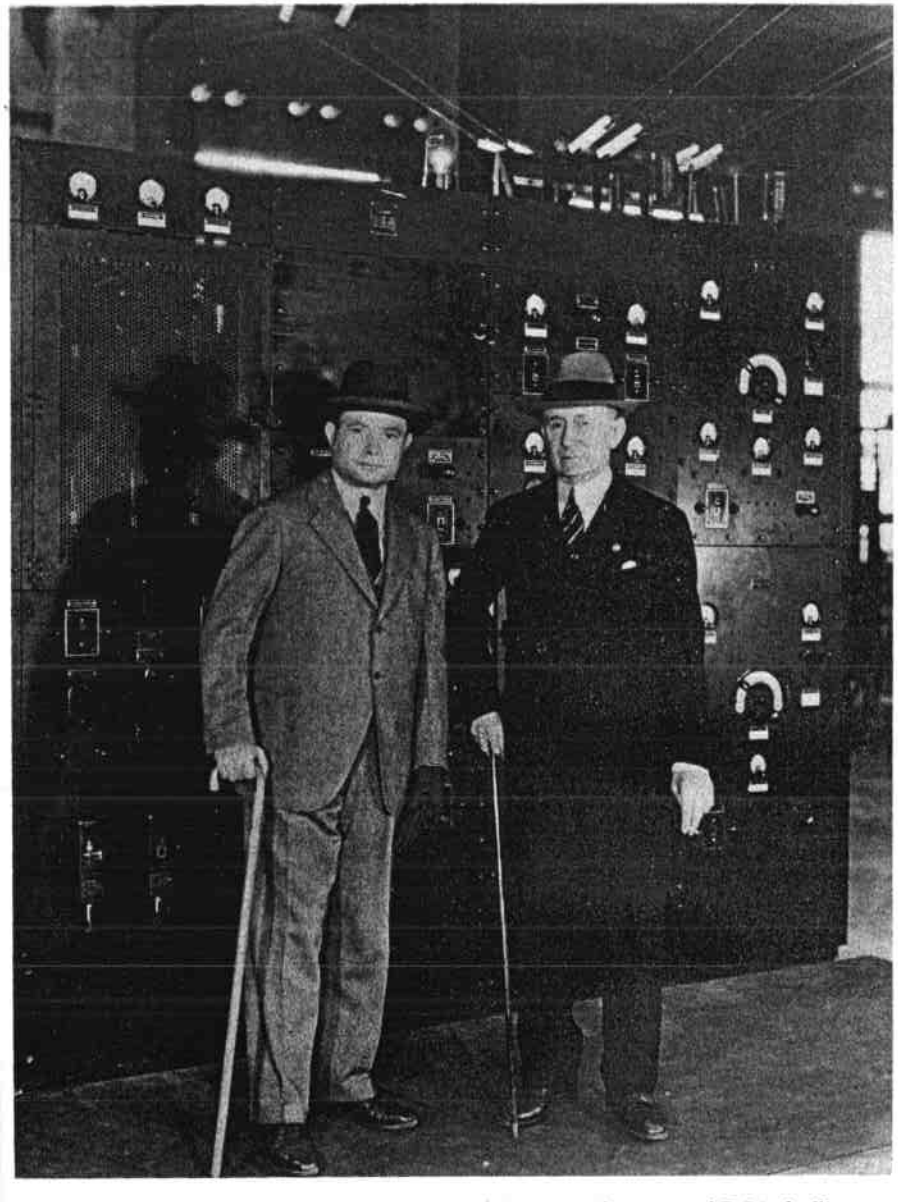
By the end of October the divorce plans neared completion. GE and Westinghouse were to withdraw from the RCA and NBC boards. NBC would be a wholly owned subsidiary of RCA. GE and Westinghouse would retain their broadcasting stations, but NBC would manage them.

NBC would go ahead with a plan already widely discussed, of moving to a new complex of buildings being planned for mid-Manhattan. This vast Rockefeller project, for which blocks of brownstone buildings were being leveled, seemed to defy the Depression itself, and had caught the imagination of the public—which called it Radio City. To clinch the move, the Rockefeller interests made new concessions to RCA.

As election day approached, there were still unsolved questions concerning the extent of the RCA debt to GE and Westinghouse, and the value of debentures to be issued.

On November 8, Franklin Delano Roosevelt was elected President of the United States by an overwhelming popular majority, and an electoral vote of 472-59.

On November 10 there were day and night meetings of RCA, GE, and Westinghouse officials, committees, subcommittees, and teams of attorneys. On November 11 their proposals were delivered to the Department of Justice. A few changes were needed. On Sunday, November 13, came a final RCA-GE-Westinghouse meeting, all day and far into the night. The next day, a week's postpone-



Marconi (at right) and heir apparent, David Sarnoff: a tour of RCA facilities. RCA

ment of the trial was granted. On November 21 a consent decree was signed. The trial was canceled.

Miraculously, RCA emerged as a strong and self-sufficient entity. No longer owned by other corporations, it had its destiny in hand. It had substantial new obligations in the form of debentures, but it owned two networks, broadcast stations, manufacturing facilities, international and ship-to-shore communication facilities, and experimental laboratories. It controlled a majority of the clear-channel stations in the United States. At its apex sat David Sarnoff.

In 1933 he moved his executive army and broadcasting personnel into Radio City. From a 53rd floor office he proceeded to keep watch over the radio world—and to prepare for television. It became his central concern.

FIFTY-THIRD FLOOR

In 1932 NBC had installed a television station in the newly built Empire State Building. Vladimir Zworykin was now experimenting for RCA instead of Westinghouse. The work went forward.

Prospects for television were strengthened by events in radio. The broadcasting industry, though momentarily jolted by the Depression, had in the long run been helped by it. As theater and film audiences shrank, home audiences grew. Broadcasting had won an almost irrational loyalty among listeners. According to social workers, destitute families that had to give up an icebox or furniture or bedding still clung to radio as to a last link with humanity.

Many factors contributed to this. Radio brought into homes President Roosevelt's "Fireside Chats"—an important cohesive force during darkest Depression days. At the same time, troubles overtaking theater and vaudeville were bringing a new surge of talents to radio audiences, including leading comedians like Ed Wynn, Eddie Cantor, Fred Allen, Burns and Allen, Jack Benny, Jack Pearl, and the Marx Brothers. Meanwhile daytime serials had developed an extraordinary hold over home audiences. Sociologists studying the phenomenon found that women looked to such serials as *Ma Perkins* and *Just Plain Bill* and *The Romance of Helen Trent* for guidance on personal problems. Many expressed a dire dependence on serials. Thanks to this devotion, many businesses were making a financial comeback through radio sponsorship.

If radio was increasingly successful, its tone was also increasingly —and aggressively—commercial. Many people found it shoddy. Radio offered advice to the lovelorn, fortune-telling, and diverse forms of quackery. The fortunes made by Dr. John R. Brinkley, who for years used his Kansas station to promote goat-gland rejuvenation transplants and drug sales, had brought an influx of patent medicine sponsors. Commercials, which had been brief and diffident in NBC's first days, were becoming long and unrelenting—but successful instruments of merchandising.

To Sarnoff the affluence was crucial: it would pay for the advent of television. Once again the formal, commercial debut of television seemed an early possibility. But once more a new problem intervened: this time, a crisis precipitated by events in the Senate.

Soon after taking office, the Roosevelt administration proposed replacing the Federal Radio Commission (FRC) with a new Federal Communications Commission (FCC), to regulate not only broadcasting but also the telephone—which had been under the jurisdiction of the Interstate Commerce Commission. The AT&T entanglement with broadcasting seemed to make the move logical.

But with change in the air, the congressional debate turned into an uprising against the status quo, fomented mainly by educators, churchmen, and labor leaders. They protested the growing commercialization of the air. They protested that channel assignments, both under the Commerce Department and the FRC, had delivered the field almost wholly to the advertising world, squeezing out competing interests and values. They now demanded cancellation of all licenses and their reassignment—with 25 per cent of all channels going to non-profit organizations.

Led by Senator Robert F. Wagner of New York and Senator

President Franklin D. Roosevelt in Fireside Chat. CBS

Henry D. Hatfield of West Virginia, the insurrection seemed within reach of success. Its anger was epitomized by the writer James Rorty, who in 1934 published *Our Master's Voice*—a title adapted from an RCA trademark. Rorty wrote:

> The American apparatus of advertising is something unique in history. . . . It is like a grotesque, smirking gargoyle set at the very top of America's skyscraping adventure in acquisition *ad infinitum*. . . . The gargoyle's mouth is a loudspeaker, powered by the vested interest of a two-billion dollar industry, and back of that the vested interests of business as a whole, of industry, of finance. It is never silent, it drowns out all other voices, and it suffers no rebuke, for is it not the voice of America? That is its claim and to some extent it is a just claim. For at least two generations of Americans—the generations that grew up during the war and after—have listened to that voice as to an oracle. It has taught them how to live, what to be afraid of, what to be proud of, how to be beautiful, how to be loved, how to be envied, how to be successful.

Comedians to radio: Ed Wynn as Fire Chief. NBC

To Rorty, the earthly atmosphere was saturated with never-ending "jabberwocky" from hundreds of thousands of loudspeakers.

> Is it any wonder that the American population tends increasingly to speak, think, feel in terms of this jabberwocky? That the stimuli of art, science, religion are progessively expelled to the periphery of American life to become marginal values, cultivated by marginal people on marginal time?

Powered by such rhetoric, the Wagner-Hatfield drive urged the redistribution of channels as an amendment to the pending Communications Act. It won wide support from educational, religious, and labor groups.

Most such groups had little prospect of financing broadcasting stations. Their amendment therefore proposed that non-profit stations be allowed to sell advertising to the extent of their expenditures. Advertising revenue would be permitted to defray costs, but not to yield a profit.

The idea opened them to scornful attack: these supposed haters of advertising were proposing *more* advertising. Apparently they just wanted to "muscle in" on advertising revenues. Besides, said commercial broadcasters, existing stations and networks had ample unsold time available for educators, churchmen, and others. To underscore this point, NBC-red gave a network berth to the *University of Chicago Round Table*, a program that had begun locally; NBC-blue inaugurated an *America's Town Meeting of the Air*, emanating from New York. Such ventures helped put down the insurrection. On the Senate floor, Wagner-Hatfield lost, 42-23. The Communications Act of 1934 thus became law without the troublesome amendment. At the same time, it had sparked an eruption of "public service" programs.

By 1935 a feeling of security had returned to the 53rd floor of the RCA Building. Sarnoff felt it was time for major moves on behalf of television.

Television could establish itself only if there were industry-wide standards, with telecasters and set users all committed to the same system. Sarnoff now wanted the new Federal Communications Commission to adopt standards–based, he hoped and expected, on the RCA system–and he asked the FCC to allocate the needed spectrum space.

In April 1935 Sarnoff made the dramatic announcement that RCA was appropriating a million dollars for television program demonstrations. The FCC, prodded by the RCA announcement, prepared for intensive study of the future of broadcasting, with special attention to television. Hearings would be held the following year; testimony was invited from all concerned.

In Radio City, NBC studio 3H–less than two years old–was converted into a television studio, with light grills and catwalks for technicians. In his usual meticulous fashion, Sarnoff was coordinating all moves.

And yet, even now, the road ahead was not clear. Ironically, the veteran patent fighter was faced once again with patent problems –not from rival corporations, but from inventors in the mold of the boy Marconi–inventors who insisted on inventing on their own. Two such experimenters posed special–and eventually agonizing–problems.

OF ATTICS AND BACK ROOMS

Philo T. Farnsworth, child of a large Mormon farm family, did not encounter electricity until he was fourteen and his family got a Delco system. He at once knew how it worked and applied electricity to his mother's handcranked washing machine. He became an ardent reader of electrical journals. In 1922 at high school in Rigby, on the upper Snake River in Idaho, he staggered his science teacher by asking advice on an electronic television system he was contemplating. The boy said he had been reading about systems involving mechanical wheels and considered those doomed; covering several blackboards with diagrams to show how it might be done electronically, he asked, should he go ahead? The baffled science teacher encouraged him. Philo, thin and with an undernourished, pinched look, worked his way through college with a patchwork of jobs including radio repair work and, one year, work on a Salt Lake City community chest drive. He told George Everson, professional fund-raiser from California who was helping organize the campaign, about his television ideas, and Everson took the youth back to California and set him up with equipment in an apartment –first in Los Angeles, later in San Francisco–while Everson belabored financiers for funds. Philo worked with the blinds drawn, stirring suspicions that led to a raid by police. They found strange

glass tubes but not the expected distillery. Philo had his first successes in 1927 when he transmitted various graphic designs including a dollar sign, which according to Everson "jumped out at us from the screen." Switching to bits of film, they used sequences of a Dempsey-Tunney fight and later of Mary Pickford combing her hair in *The Taming of the Shrew;* she combed it a thousand times for Farnsworth television. Applying for an electronic television patent, Farnsworth took RCA completely by surprise. Its attorneys contested the application, and in interference proceedings grilled Farnsworth for hours, but could not shake him. In August 1930 Philo Farnsworth, aged twenty-four, got his patent. Early in 1931 Vladimir Zworykin of RCA traveled to California to visit Philo's laboratory and have a look; he appeared impressed but was quoted as saying there wasn't anything RCA would need. Then Sarnoff came; RCA would not need anything young Farnsworth had done, said Sarnoff. But apparently RCA already felt it would have to negotiate with Philo Farnsworth.

Farnsworth was ready to license RCA on a royalty basis. But RCA had a policy: what it needed, it bought outright. It didn't pay royalties; it collected them. However, in due time it came to terms with Philo Farnsworth. The RCA attorney is said to have had tears in his eyes as he signed the contract.

The extraordinary victory may well have encouraged another embattled inventor, Edwin H. Armstrong. His dispute with Sarnoff, gradually growing into a complex feud, had fateful implications for both radio and television.

Armstrong and Sarnoff had known each other since 1914 when Armstrong, a Columbia University student–and a long-time amateur experimenter in his Yonkers attic–invented a new circuit that was said to do wonders; Sarnoff was delegated by American Marconi to evaluate it. In a drafty shack in Belmar, N.J., throughout a winter night, Armstrong and Sarnoff huddled together pulling in Ireland, Germany, Hawaii–taking down messages to be checked later with the originating stations. "Well do I remember that memorable night," Sarnoff was to write Armstrong years later. "Whatever chills the air produced were more than extinguished by the warmth of the thrill which came to me at hearing for the first time signals from across the Atlantic and across the Pacific." The encounter held the seeds of friendship–and of longer conflict. There was a gulf between them: Armstrong was a lone experimenter, Sarnoff a company man.

Edwin H. Armstrong, inventor–during World War I. Smithsonian

During and after World War I, Armstrong invented other sensational circuits and in 1922 sold a patent to RCA and was suddenly a millionaire. RCA also got first refusal on his next invention.

"I wish," said Sarnoff to Armstrong one day, "that someone would come up with a little black box to eliminate static." The implication of the phrase, an allusion to Marconi's black box, was not lost on Armstrong. He liked the challenge. And he himself had been thinking about static.

The world lay before him. He married Sarnoff's secretary. He

accepted a Columbia University research appointment at $1 a year and began working ceaselessly at his own expense in the basement of Philosophy Hall, occasionally emerging to read brilliant papers at scientific gatherings—a tall, lanky figure with a drawling voice. When he argued with opponents, he was inclined to demolish them, and he won important enemies, including De Forest. But mostly he just worked.

Ten years passed. Late in 1933 Armstrong took out four patents and notified Sarnoff that the little black box was ready. Sarnoff and various RCA engineers made the trip to the Columbia University campus. What they found was not exactly a black box but two rooms full of equipment representing an entire new radio system —"frequency modulation," FM. Not just an invention, said Sarnoff at one point, but a revolution.

RCA decided on field tests. In March 1934 Armstrong was invited to install his transmitter equipment in the Empire State tower. The FM receiver was placed seventy miles away on Long Island. The log of the first day, June 16, 1934, included a prophetic notation by an engineer. A new era, he wrote, "is now upon us." Results exceeded Armstrong's claims. Defying thunder and lightning, FM transmitted a range of sound never before heard, and was virtually static-free.

The tests went on, reports were written and studied. Armstrong waited. Then, in April 1935, he was "politely" asked to remove his equipment from the Empire State Building. That same month RCA announced its allocation of $1,000,000 for television tests. A wave of publicity heralded the imminence of television, as the FCC prepared for crucial decisions on the spectrum.

Armstrong became fearful. He had worked more than a decade on FM. Since receiving his patents, he had maintained public silence on the subject for two years, partly because he felt he owed this to RCA, and partly because RCA seemed the one organization able to accomplish the revolution FM called for. Now the sudden flurry of RCA television moves, accompanied by total silence on FM, confirmed a feeling that the company hierarchy wanted no part of

frequency modulation. Was RCA intent on sidetracking—even sabotaging—his invention? Armstrong became convinced it was.

He acted with resolution. He decided on a public demonstration, to be staged at the November 1935 meeting of the Institute of Radio Engineers. It was announced that Armstrong would read a paper on his latest work; the demonstration itself would be a surprise.

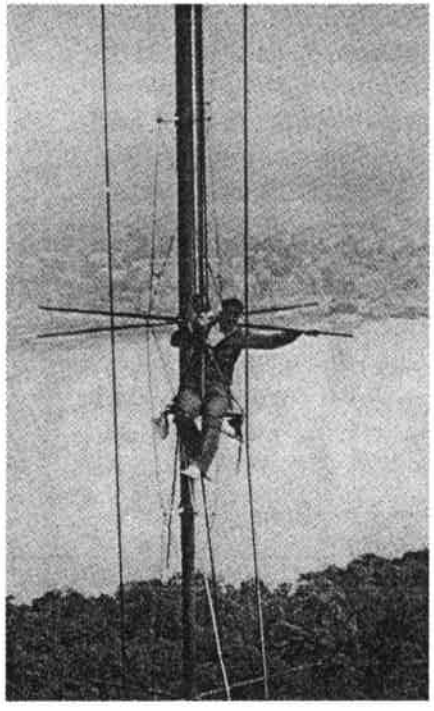
He prepared for months with the help of his friend Randolph Runyon, whose amateur station in Yonkers was adapted especially for the demonstration. Armstrong read his paper, then drawled: "Now suppose we have a little demonstration." As the receiver groped through space, the audience heard a sound that would become familiar to FM listeners. In the words of Lawrence Lessing, there was a

> roaring in the loudspeaker like surf on a desolate beach, until the new station was tuned in with a dead, unearthly silence, as if the whole apparatus had been abruptly turned off. Suddenly out of the silence came Runyon's supernaturally clear voice: "This is amateur station WZAG at Yonkers, New York, operating on frequency modulation at two and a half meters." A hush fell over the large audience.

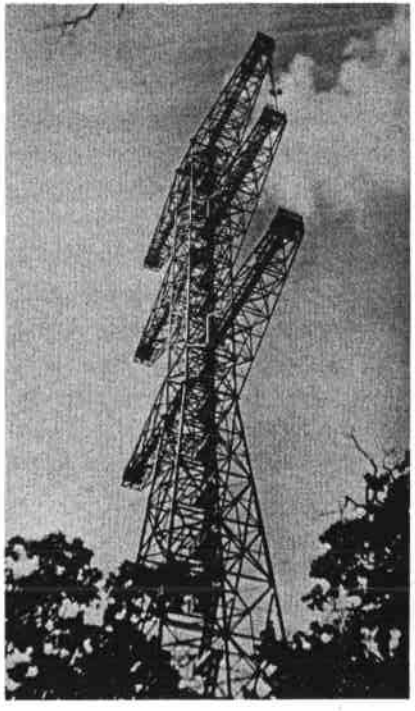
The demonstration included music and other items. A glass of water was poured in Yonkers. In New York it sounded like a glass of water—not, as in AM, like a waterfall.

In the spring of 1936 Armstrong presented to the FCC the case for spectrum allocations for FM. RCA, pressing solely for television allocations, was represented not only by Sarnoff but by C. B. Jolliffe, who a few weeks earlier had been the FCC chief engineer but was now suddenly an RCA executive. The RCA witnesses hammered at one theme: the readiness of television and its needs in the spectrum. They did not mention FM. The battleground was the upper frequencies, where both inventions needed elbow room. The battle was joined.

The policies pursued by Sarnoff were in the interests of RCA as he saw them. He saw television as an invention "about ready" to



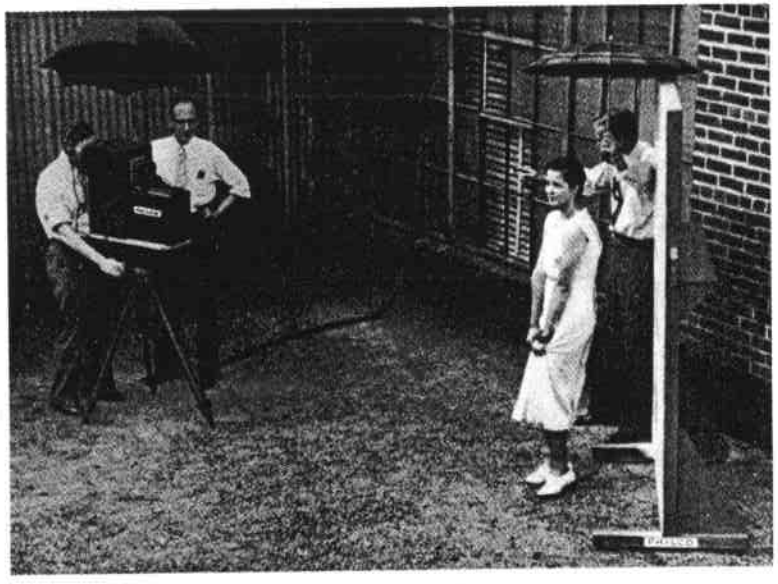
Armstrong builds transmitter tower.
Columbiana



Completed tower: W2XMN—1938.
Columbiana

take its place beside radio in every home. RCA had invested in television large sums from radio earnings, and counted on continued earnings to carry the work forward. FM was seen as an invention that could only disrupt the structure of radio and plunge it into years of readjustment and loss. FM posed a threat not only to the status of radio but to funds needed for television. RCA was therefore not inclined to promote FM. Because of RCA's position in the industry, its stand loomed as a fatal roadblock. To Armstrong it was "sabotage" of a major invention.

When Armstrong asked the FCC for a license for an experimental FM station, the request was at first denied. The FCC, influenced by Sarnoff, had caught the television fever, and saw FM as an obstacle. With demonstration and argument, Armstrong persisted, and finally got his license. He cashed a block of his RCA stock and began to build a 50,000-watt FM station at Alpine, N.J., across the river from Yonkers. He himself climbed around the huge antenna tower, supervising each detail. It was the start of a long and bitter war. He was tackling a giant.



Philadelphia: Farnsworth experimenting at Philco—early 1930's. Philco

TARGET DATE

RCA prepared for its million-dollar television program demonstrations. It was not alone in the field. Farnsworth had won backing from Philco and moved to Philadelphia to continue his television

TESTING–
NEW YORK

Make-up for Betty Grable: green face, purple lipstick–1937.
National Archives

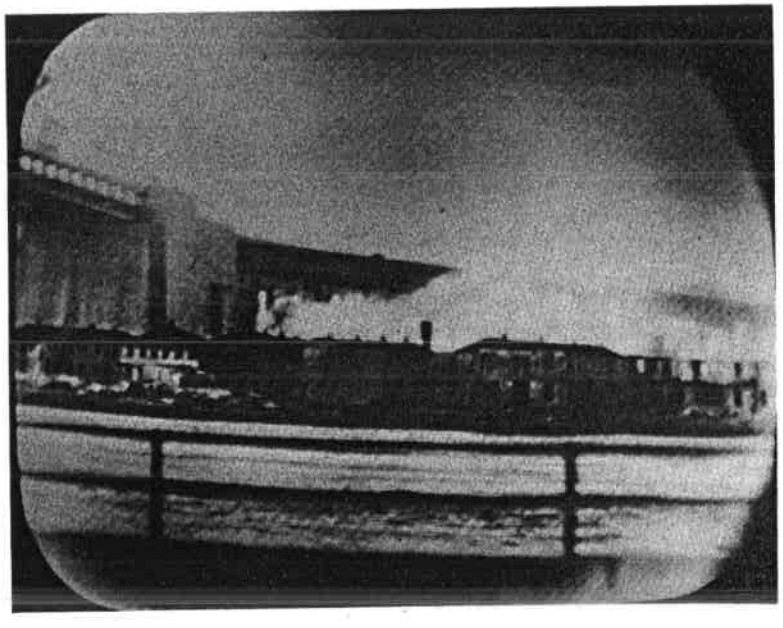
experiments there. Another young genius, Allen B. Dumont, who had worked with Francis Jenkins, was making progress in New Jersey. In Los Angeles there were tests by a regional West Coast network, the Don Lee network. Various unresolved patent issues would have to be resolved before commercial use was begun. Meanwhile experimenters pushed ahead.

To the Empire State transmitter elaborate productions, including drama, began to travel by cable from rebuilt Studio 3H in Radio City. The schedule began with two programs a week, Tuesdays and Thursdays. Actors began to be seen in Radio City cafeterias with green make-up and purple lipstick, and they were plied with questions. Before long the phenomenon no longer caused comment: such things, it was understood, were somehow necessary in the new medium.

Other kinds of programming were tested. In 1936 a "coaxial cable" between New York and Philadelphia, developed by AT&T,

NBC mobile unit–into action 1937. NBC

Fire telecast via mobile-unit relay–New York, 1938. National Archives



was ready for use, setting the stage for remote pickups and networking tests. The following year a television mobile unit went into action in New York City, to experiment in pictorial journalism. It consisted of two huge busses; one was a studio crammed with equipment for field use; the other housed the transmitter that relayed programs to the Empire State tower for rebroadcast by the main transmitter. Television seemed indeed to be "about ready." Sarnoff picked a target date for its commercial debut: the 1939 World's Fair, scheduled for New York City.

But news about the imminence of television began to be pushed aside by other matters, relating to the international scene. In 1938 Adolf Hitler, in power in Germany since 1933, annexed Austria and, under the infamous "Munich pact," a portion of Czechoslovakia. Japan intensified its attacks on China. Spain, in bloody conflict, was falling under the control of Francisco Franco, ally of Hitler and Mussolini.

While Sarnoff and RCA and NBC were concentrating on the emergence of television, these world upheavals were focusing increased attention on radio, and especially on CBS. Throughout the 1930's CBS had been trying to catch up with its formidable rival. It had considerable unsold time in its schedule but, far more effectively than NBC, was making creative use of it. Substantial time was given to experimental, unsponsored programming, including news. As world turmoil increased, CBS was building—under Paul White—a news service that soon made the voices of H. V. Kaltenborn, Edward R. Murrow, Eric Sevareid, William L. Shirer, Elmer Davis, and others known in every home. In 1938 CBS introduced the "world news roundup" format with short-wave pickups from any and all continents. In drama CBS was winning a similar celebrity through the works of Norman Corwin, Archibald MacLeish, Orson Welles, and others. These often touched on the world scene, as in *They Fly Through the Air*, a scathing verse play on fascism with which Corwin won a wide following; *The Fall of the City*, in which MacLeish foreshadowed with startling accuracy the Nazi


BROOKLYN QUEENS LONG ISLAND

DAILY NEWS

NEW YORK'S PICTURE NEWSPAPER

FINAL

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FAKE RADIO 'WAR' STIRS TERROR THROUGH U.S.

RISE OF CBS

Orson Welles: "I had no idea . . ."
Wide World

RISE OF CBS

Voice from London: Edward R. Murrow CBS

H. V. Kaltenborn during Munich crisis —with CBS news chief Paul White. CBS

take-over of Vienna; and the Welles production of the H. G. Wells *War of the Worlds*, with Martian landings placed in the New York area—with a realism that precipitated panic in many parts of the United States. The reaction to this drama apparently reflected the national edginess over the world situation; it also confirmed the rising competitive standing of CBS programming. NBC found itself trying to emulate CBS achievements in news and drama. At the moment when television was awaited, radio was strengthening its hold on the public. It was even winning admiration from intellectuals who had generally despised—or ignored—radio.

At the same time, the Roosevelt administration was turning from domestic concerns to rearmament. Once more executives of major corporations—this time including RCA delegations, led by a diligent David Sarnoff—were back and forth to Washington to discuss military production needs. When Germany invaded Poland in 1939, Roosevelt proclaimed a limited national emergency, diverting strategic materials from domestic manufacture to war requirements. In production was a navy item closely related in technology to television, but with a name not yet to be spoken, even in a whisper —radar. RCA, child of the military, was suddenly in the midst of war production.

Even at NBC, the atmosphere was militarized. In 1936 Sarnoff, to fill a vacancy in the NBC presidency, had selected a military man, Lenox Lohr. Sarnoff was following RCA tradition.

The sense of gathering crisis cast an atmosphere of doom around the anticipated coming of television. But this went forward on schedule, and generated some of the hoped-for excitement. On February 26, 1939, a test pickup from the unfinished fair grounds featured a telecast of *Amos 'n' Andy* in blackface make-up. On April 30 came the formal opening, in which Franklin D. Roosevelt became the first President to appear on television.* Sarnoff also spoke. RCA sets with 5-inch and 9-inch picture tubes went on display, later followed by sets with 12-inch tubes. In some, the tube was

* Herbert Hoover's 1927 appearance had been as Secretary of Commerce.

seen via a hinged mirror. Prices ranged from $199.50 to $600. Crowds came and stared at the programs. Every day brought new items. The NBC schedule now included one program a day from Studio 3H in Radio City, still the network's only television production studio; one program a day from the mobile unit; and assorted films, from a film-facilities room at Radio City.

The studio programs included plays, bits of opera, comedians, singers, jugglers, puppets, and kitchen demonstrations—usually salad-mixing, because it was really too hot for cooking. Three cameras were used. The ritual of live television was by now well developed. The control room had head-phone communication with studio technicians. A continual stream of cryptic jargon flowed over the intercom wires—abbreviated instructions for adjusting camera angles and distances. This was punctuated with: "Take one! . . . Ready two. . . . Take two!" Visitors from the theater found the continuous chatter bewildering and astounding; did no one ever listen to the performers? Visitors from the film world were equally amazed at the notion that shooting and editing could be done simultaneously. In the studio the performers, still in weird makeup, worked in heat that stung the skin. Actors took salt tablets. The big cameras swung slowly. "When I am on the television set," said Earle Larimore, who starred in *The Unexpected* on May 3, 1939, "I think of those cameras as three octopuses with little green eyes blinking on and off, their silvery forms moving ponderously." The actor always felt hemmed in. Everything had to be played "close." He had to cultivate microscopic gestures.

The mobile unit was somewhere every day. On May 17 it showed a Columbia-Princeton baseball game from Baker Field. Its single camera stood near the third-base line, sweeping back and forth across the diamond and conclusively proving its own inadequacy. By the time the unit went to Ebbets Field for a doubleheader between the Brooklyn Dodgers and the Cincinnati Reds, it had acquired a second camera. Sometimes the mobile unit went to Ridgewood Grove in Brooklyn for second-rate wrestlers or boxers,

April 20, 1939: Sarnoff opens RCA exhibit. NBC

May 17, 1939: first baseball telecast—Princeton *v.* Columbia, Baker Field. NBC

or merely picked up ice skating at Rockefeller Center or planes landing at La Guardia airport or interviews with visitors to the World's Fair. It was all equally amazing. High points of 1939 were a fashion show from the Waldorf-Astoria and pickups from the sidewalk and lobby at the Capitol Theater for the world premiere of *Gone With the Wind*.

The films included sponsored travelogues, old cartoons, government documentaries: *Jasper National Park, Washington—Shrine of Patriotism, Miracles of Modernization, Donald's Cousin Gus, Millions for Safety*. Films of major film companies were not available to television.

CBS, which had experimented in television for several years, was also telecasting in New York during 1939-40. So was the experimental station of inventor Allen B. Dumont, who had succeeded in putting the first all-electronic receivers on the market. In May 1940 twenty-three stations were reported to be telecasting in the United States.

But the atmosphere of doom clouded all this activity. The FCC had authorized only "limited" commercial operation, which meant that a station could invite sponsors to do program experiments and defray their cost, but it could not sell time. In May 1940 even this "limited" authorization was rescinded because of conflicts about technical standards; television went back to "experimental" status. The following year it finally went fully "commercial," but soon afterwards schedules were reduced from fifteen hours per week to four hours per week. Most television stations left the air. Six hung on with skeleton programming to serve the 10,000 sets—they would soon be museum pieces—that had already been sold. New sets disappeared from the market. A few went into police stations for the training of air raid wardens. In New York the NBC studio telecasts began to demonstrate the duties of the warden. Handfuls of volunteers at police stations watched and listened. Television was virtually forgotten.

Its first public steps had gone well enough, but the toddler was

being hurried back into the nursery. Again its full emergence was postponed—this time, to postwar years.

But it was not merely a time of waiting. As with radio during World War I, the hiatus saw intense technical development. During this period Zworykin at RCA developed the image-orthicon, a camera tube of such improved sensitivity that performers would no longer be fried alive, and would no longer need strange, exaggerated makeup. And both RCA and CBS pushed color experimentation.

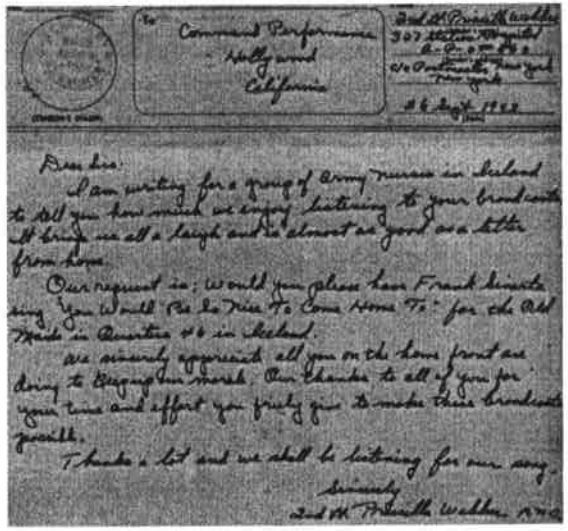
It was also a period of jockeying for position. Both Sarnoff of RCA and Paley of CBS plunged into war activity. For the Allied invasion of the Continent, both were on hand in uniform—Colonel William S. Paley with Psychological Warfare, and Colonel David Sarnoff with the Signal Corps. Sarnoff, accompanying the Allied forces into Paris, was among those who seized the French shortwave station CTSF, and promptly put it into service in the Allied cause. By the end of the war he was Brigadier General David Sarnoff. From then on, at RCA and NBC, he was "General Sarnoff" or "the General." It was appropriate to RCA tradition.

During the brief emergence of television, FM had gone through a similar cycle of ups and downs. The experimental FM station that Armstrong had built at Alpine, completed in 1939, performed so magically that a runaway boom seemed to start. CBS became an FM proponent. GE and other major companies prepared to make sets under Armstrong license. That year the FCC received 150 applications to build FM stations. This created a new crisis over spectrum space. This time, strongly backed, Armstrong won a victory. Channel 1 was removed from the television band and assigned to FM—over strong protests from television interests, especially RCA. In 1940 FM received a go-ahead, at about the same time as television. In addition, the FCC decided that television must have FM sound. Armstrong was jubilant. His struggles seemed to be heading for a triumphant climax. But suddenly it was all stopped—halted by war priorities. Armstrong, like Sarnoff and Paley,

An AFRS outlet. U.S. Department of Defense

FOR THE TROOPS

Sounds of home: Betty Hutton fries a steak—while Bob Hope provides commentary, beginning long career of entertaining troops.
U.S. Department of Defense



AFRS fan mail.

plunged into war work; he joined the Signal Corps. Soon FM became standard equipment on American tanks, jeeps, and command cars. But on the homefront it was in storage, and in a state of uncertainty.

While television and FM awaited a new day, AM seemed indestructible. In 1942 the armed forces, recognizing its powerful hold, built a worldwide Armed Forces Radio Service to bring American programs to troops overseas, wherever stationed. By 1945 AFRS had over 800 outlets. Some were mere 50-watt stations in Quonset huts, or wired systems on ships, but all received 42 hours of recorded programs per week, plus others by short-wave relay. Thus AM radio, on the eve of television, had a worldwide reach and great prestige, and looked forward to postwar splendor.

The industry was increasingly competitive. A 1941 FCC ruling had required RCA to divest itself of one of its networks; the purpose was to end its overwhelming dominance. RCA sued to block the order, but lost. Thus NBC-blue was sold in 1943 to Edward J. Noble, the Lifesaver king, for $8,000,000, and became ABC, the

American Broadcasting Company. Network competition became a three-way rivalry, on more nearly equal terms.* NBC, backed by RCA, was still the most formidable entity. But all were prosperous and potent. All eyed the postwar era.

The end of World War I had precipitated the radio-broadcasting boom. The end of World War II held similar promise for television.

* The Mutual Broadcasting System, a large group of stations exchanging programs, never achieved a truly competitive position.

PLASTIC YEARS 3

"My salad days,
When I was green in judgment."
SHAKESPEARE