

RADIO



COMMUNICATION
TODAY & TOMORROW

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RADIO

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RADIO



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INTRODUCTION

It is late at night, April 15, 1912, and 18-year-old David Sarnoff is bored. He sits behind a massive wireless radio set in New York City, where his job is to monitor a radio-receiving station. His eyelids grow heavy as he sits and listens to the faint noises that come through his headphones. It has been a quiet evening.

Suddenly, Sarnoff bolts upright in his chair, alert and tense.

A weak Morse code signal is coming in. Sarnoff grabs a pencil and begins writing the message on a pad in front of him. Only a few words are written before Sarnoff drops the pencil and gasps.

His notes read: "S.S. Titanic ran into iceberg. Sinking fast."

"The *Titanic*? That's impossible!" he says to himself.

Sarnoff shakes his head. He can't believe he has heard the message correctly. The *Titanic* is the largest

ship in the world, and is on its very first voyage. The *Titanic* is said to be unsinkable!

Sarnoff is wide awake now. He radios back a response to the ship asking for more details. After a long wait the message from the *Titanic* is repeated.

Sarnoff knows he has to act quickly. He notifies the press, and then listens intently to his radio as other messages from the doomed ship come in from somewhere in the icy Atlantic Ocean.

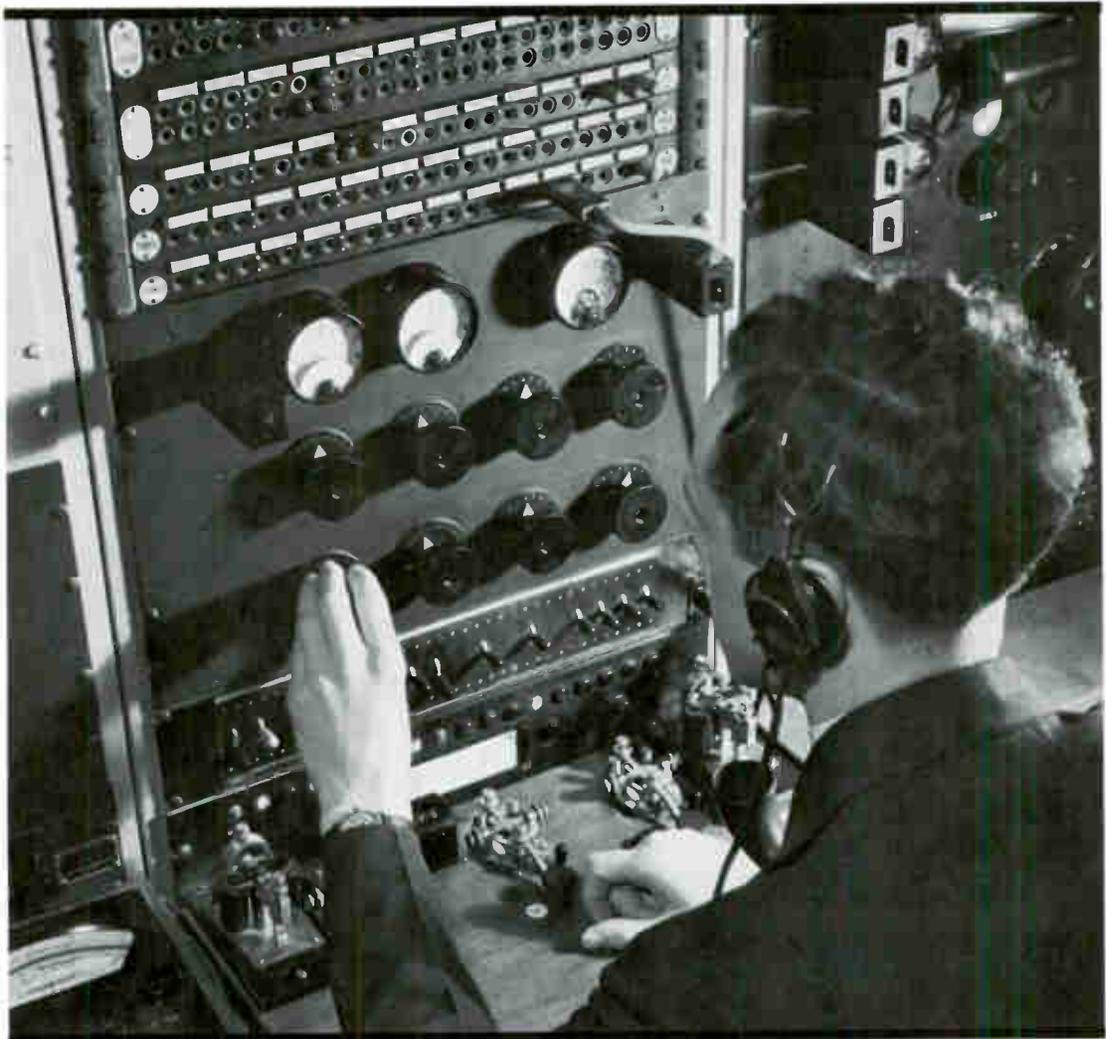
A large group of people gathers around Sarnoff and his radio set as he fires off directions to rescuers at sea. Police surround Sarnoff and begin pushing the anxious crowds away. President William Taft hears of the disaster and orders all other wireless operators off the air. There must be nothing to hinder Sarnoff as he communicates with the ships at sea.

Sarnoff remains at his post for the next 72 hours, until the name of the last survivor of the *Titanic* comes in. Finally, Sarnoff slumps back, exhausted. His mind and body are numb.

Although more than 1,500 people have died in the tragedy, Sarnoff's

efforts have helped to save hundreds of lives. He and his radio have become famous overnight!

Sarnoff is proud of his efforts. His weary mind, however, cannot yet imagine the impact this drama will have on the world, and on the future of wireless radio.



David Sarnoff—and radio—became an overnight sensation after the Titanic disaster.

The Impossible Dream

David Sarnoff's three-day adventure marked the first time that radio became a household word. Around the world, people were excited by the possibilities of the "wireless." Young men and women, eager for adventure and new challenges, began to study radio's potential. Within a few years, radio had become a part of life. A new age of communication was born.

Radio is much more than a box with a maze of wires inside. It is a process of communication, using invisible pulses called electromagnetic—or radio—waves. Radio waves are created by a special device called a "transmitter." The earliest radios only transmitted the "long" and "short" sounds of Morse code. Today, when waves are put together in the right pattern, they can carry human voices, music, and countless other sounds.

They can't be seen, touched, or tasted, but the radio waves that crisscross the Earth keep us communicating 24 hours a day, year 'round.

Radio helps us stay in touch with friends near by and helps us speak to people thousands of miles away. It warns us of danger and it keeps us entertained.

The people whose ideas helped shape what radio is today never imagined the effect radio has on our lives. Their main goal was simply to find a better way to communicate. In the early days of radio—from the late 1890's to the 1920's—the goal often was just to get "on the air."

In almost no time, radio developed into a giant global communication network, linking every nation and even reaching far into space. When someone today talks about the "shrinking world," they are describing just that. Radio, and more recently TV, has helped bring the peoples of the world closer.

Its impact on our lives can't be measured.

CHAPTER ONE

RADIO MAKES WAVES

The Induction Theory

In 1832, two scientists—an ocean apart—each made a discovery that paved the way for modern-day radio. American Joseph Henry was a Princeton University professor. Michael Faraday was a British scientist. Both men experimented with devices called electromagnets.

Henry and Faraday's electromagnets were made up of a soft iron core surrounded by wire. This simple machine became a temporary magnet when electric current flowed through the wires.

Working independently, Henry and Faraday used electromagnets to demonstrate that an electric current in one wire can produce a current in another wire. The current will pass between the wires even though the

wires are not connected. This idea is called the induction theory. It demonstrated that electric currents could move through the air as well as through wire.

Hertz Closes the Gap

In the 1880's, a German scientist named Heinrich Hertz proved that electromagnetic waves did, indeed, exist. He also proved that they traveled at the speed of light.

Hertz used a simple setup to demonstrate that such waves could be sent out through the air at will. He used two loops of wire—separated by more than 200 feet—to test his theory.

A small gap was cut in each of the wire loops. When Hertz ran an electric current through one loop, the



Heinrich Hertz proved electromagnetic waves exist. His experiments lead to the discovery of the wireless radio by Marconi.

current leaped across the gap in the wire. That was impressive enough, but observers reported the same thing happening at the other loop at exactly the same time. The electric current had travelled through 200 feet of space between the loops!

Marconi and the Telegraph

The next major step in the development of radio happened in Italy in 1895. A young inventor named Guglielmo Marconi was interested in the work of Samuel Morse, the inventor of the telegraph. This interest led him to experiments with radio.

The telegraph was a wonderful device. It allowed people to transmit Morse code signals with an electric current over great distances. There was one major drawback, though. Its use was limited to those places that could be joined by wires.

Marconi was obsessed with learning about the telegraph. He sought the help of an old blind man who had once been a telegraph operator. The man taught Marconi how to send

messages with Morse code.

The code was sent by tapping a key in a special sequence. Such tapping caused “breaks” in the electric current that passed through the lines. These breaks could be heard at the other end of the telegraph line as small clicks. Different combinations of long and short clicks were used for each letter in the alphabet.

Marconi quickly mastered the telegraph and Morse code. This success stirred his passion for electrical experiments even more.

The First Aerial System

The next step for young Marconi was to copy Hertz’ work with electromagnetic waves. Much to his parents’ dismay, he did his experiments in the family’s garden and farmyard. Despite their mild protests, he didn’t give up. He made gradual improvements in the system of wire loops. He worked until he could send signals between wires three hundred feet apart.

Marconi reasoned that signals could be sent better if he could get

his wires off the ground. He got permission from his father to string wires at various places around the farm. In doing so, he made the first aerial system. It was so strong it could send a wireless signal more than a mile!

Marconi's system was impressive, but he needed a way to show its worth. The trick, Marconi decided, was to use the long-distance ability of the telegraph and apply it to his own device.

A New Team: Telegraph and Radio

Marconi took a telegraph key and wired it into one of his aerial loops. As he pressed the key, small clicks could be heard in the receiving loop. This discovery would allow him to send telegraph signals—real information—through the airwaves. When Marconi pressed his key, he became the first person to send telegraph signals through the air!

This simple addition to Marconi's experiment was the secret to radio communication. Marconi was only

22 years old, but he was able to solve the problem that had puzzled scientists for hundreds of years.

Marconi's father urged him to offer his invention to the Italian government. He did so, but for some reason he was refused. So the young Marconi sailed to England to people who might want his radio system. He set up demonstrations for important scientists. With the same basic setup he used in Italy, Marconi was able to transmit radio signals as far as nine miles.

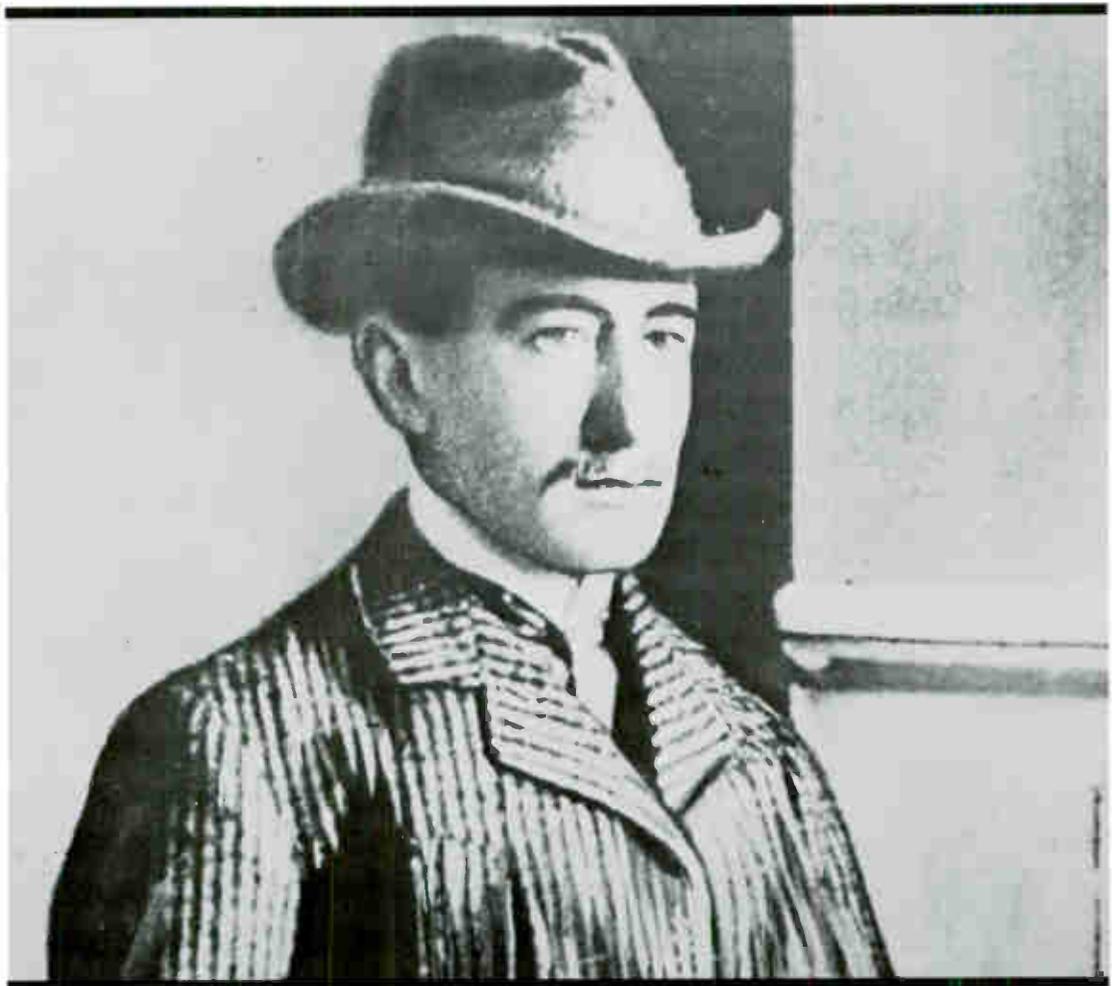
His success brought him praise from some and stirred anger in others. Some jealous inventors accused Marconi of playing tricks. Despite this, Marconi pressed on. He patented his system and sold most of the rights to a company which called itself the Wireless Telegraph and Signal Company, Ltd. He was paid £100,000—about \$150,000. The name of the company was soon changed to the Marconi Wire and Telegraph Company, to cash in on the young man's fame.

In 1899 Marconi sailed to America to set up a demonstration for the

U.S. Navy. He placed his wireless device on two ships, the *New York* and the *Massachusetts*. A Morse code signal was sent between the ships, which were 36 miles apart. The signal came through clearly! Marconi soon topped this feat by sending a signal more than 200 miles across the seas.

Signals Across the Sea

In December, 1901, Marconi again traveled across the ocean—this time to Newfoundland, Canada. There he would try to receive the first wireless message sent across the Atlantic ocean. An antenna was set up in Newfoundland to receive



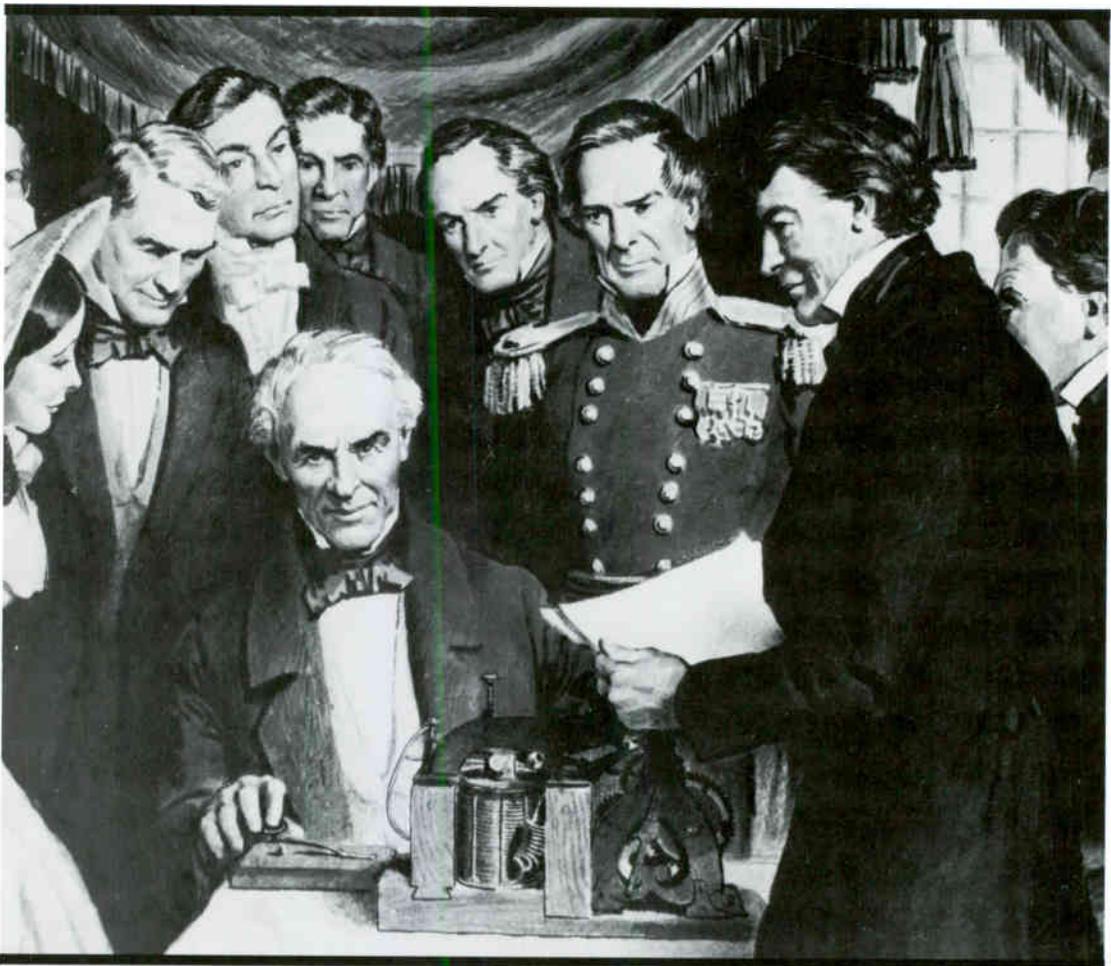
Young Italian inventor Guglielmo Marconi transmitted the first long-range wireless signals in 1895.

signals from England, more than 1,800 miles away.

Marconi later wrote a description of the adventure: "I sent up kites every day this week with the vertical aerial [attached] by which our signals are received. I had previously cabled to my station at Cornwall [England] to begin sending the pre-

arranged signal. On Wednesday, my kite blew away... Thursday, however, I had better luck... myself and my assistant, Mr. Kemp, received [a] signal!"

Those weak signals astounded the world. For the first time ever, messages could be sent across entire oceans without the aid of wires.



Samuel Morse (seated) served as an inspiration for Marconi. Morse invented the telegraph, which was the basis for Marconi's wireless system.

CHAPTER TWO

RADIO FINDS ITS VOICE

DeForest: On the Same Wavelength

Marconi's success quickly caused a big interest in wireless communication. Thousands of people began working with their own wireless systems. Among them were two men named Lee DeForest and Reginald Fessenden.

Lee DeForest experimented with wireless signals in his bedroom. He admired Marconi, but he also wanted to compete with the Italian inventor. DeForest heard that Marconi was coming to America. Marconi was going to report—by wireless—the results of a big boat race off Newport, Rhode Island. DeForest decided to compete with Marconi by reporting the race results himself.

It was a good idea, but it failed badly. Both men headed out to sea

with their equipment and started sending the results back in Morse code. Assistants waited on the beach to receive the signals. However, both men were using the same wavelength for their signals. This caused the signals to interfere with each other. The men on the beach couldn't understand either man's signal!

Even though DeForest's plan didn't work, the publicity came in handy. He soon got the financial support of wealthy businessmen who were interested in his ideas. He used their money to build wireless sets, which were then sold to shipping companies and the U.S. Navy.

DeForest's business did well for a time, but a lawsuit over patent rights cost him everything. By the age of 33, DeForest was flat broke and looking for a way to redeem himself.

Fessenden's Towers

One of DeForest's rivals was Reginald Fessenden. At the time of DeForest's quick fall from fame, Fessenden was working on a system that would carry a human voice across the ocean. While Marconi had success sending Morse Code across the Atlantic, voice communication across such a distance was a far greater challenge.

Fessenden made a device called the liquid barreter, which would allow him to send a steady signal through the air. This meant the signal could carry a human voice, instead of the electrical "dots and dashes" of Morse code.

The liquid barreter was shaped like a light bulb. It was able to send the delicate sound of a voice across the airwaves. The trick for Fessenden was to boost the power of this



Reginald Fessenden was the first person to send radio signals across the Atlantic Ocean.

signal to get it across the vast Atlantic Ocean. To accomplish this feat, Fessenden erected two 400-foot towers, one in Massachusetts and one in Scotland.

In early 1906 Fessenden was able to send Morse code signals in both directions between his giant towers. Fessenden was thrilled as strong signals pierced thousands of miles of air to reach the other shoreline. A strong signal was the first major step toward reaching his goal of sending voices over the same long distance.

The signals crackled back and forth for three days until a huge electrical storm—perhaps caused by sunspots—fell across the Atlantic and made the system go silent. As Fessenden labored to find out what the problem was, a storm knocked over his tower in Scotland. Fessenden felt like a cursed man, but he didn't give up.

A Special Christmas Message

On Christmas Eve 1906, Fessenden was ready to try again. This time he would be sending out a new kind

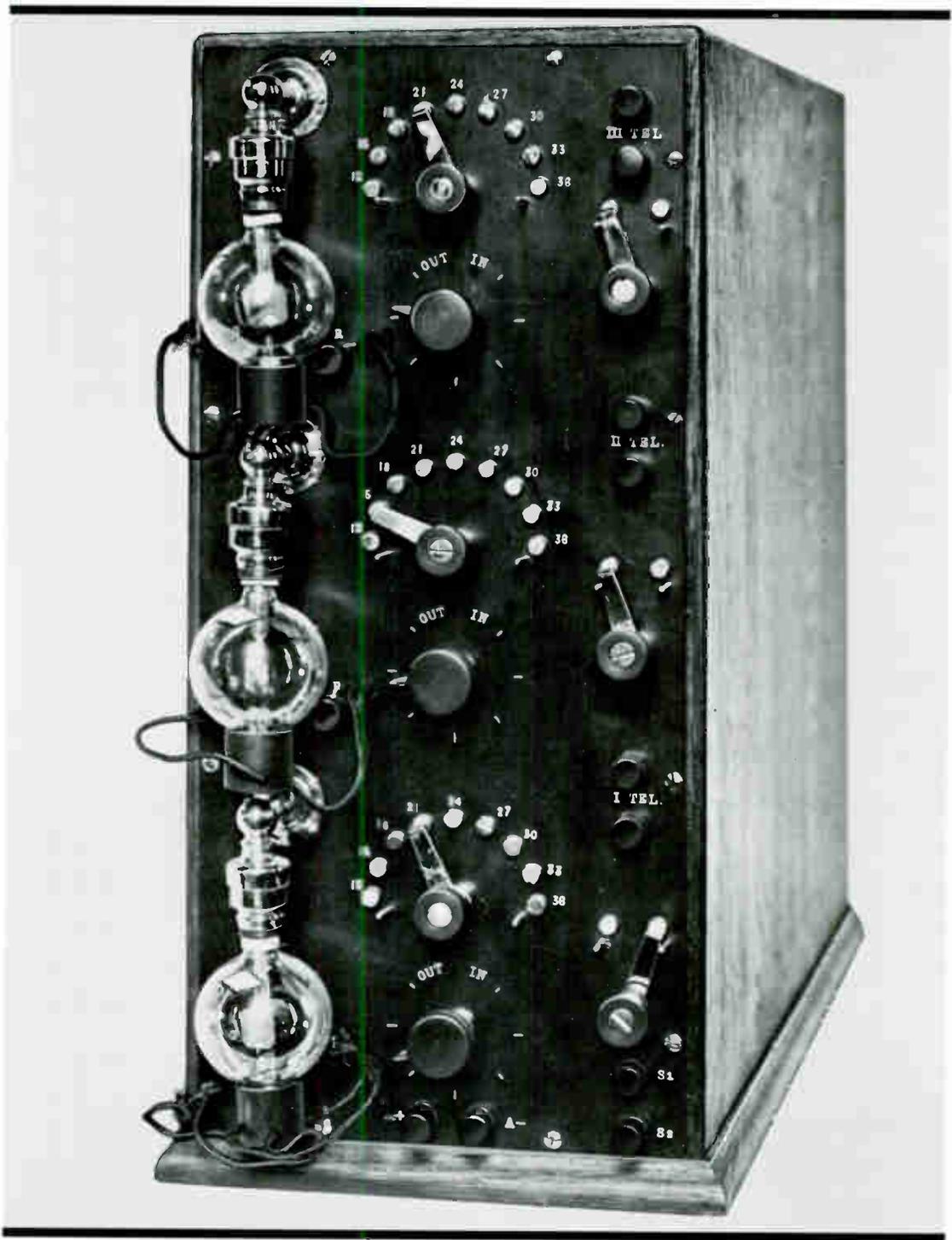
of signal—his own voice! With only the sending tower still standing, the odds were against him.

Fessenden cleared his throat and made a short speech over his new wireless system. When he finished, he looked nervously at his wife, Helen. “What next?” he seemed to ask. She turned on a phonograph and Fessenden moved his microphone close to the machine. Music filled the room and went out over the air on the invisible radio signal.

Fessenden could only hope that someone—somewhere—was hearing his signal. He sighed, again unsure of what to do next. Finally, he picked up his violin and played a Christmas carol.

When he had finished, his wife handed him a Bible. He read aloud: “Glory to God in the Highest, and on Earth peace to men of goodwill.” He stood in silence. He thought about playing his violin again, but finally just cried “Merry Christmas to all!”

He began to shut down his system, then stopped. He walked back to the microphone and quickly asked anyone who had heard the words and



This early radio used vacuum tubes invented by Lee de Forest to detect radio waves.

music to write to him.

Within a few days, Fessenden started to receive reports of his “broadcast” from wireless operators aboard ships hundreds of miles at sea. His experiment had worked! By sending his voice over the airwaves, Fessenden had opened the door to the entire field of radio broadcasting.

SOS!

Until about 1909, radio was still something of a novelty. It was definitely a thriving industry, but on a small scale. Most of the wireless radios in use were found aboard ships. As voice communications between ships—and between ships and shore—became more common, an accident at sea showed how useful radio could be.

During that year, a collision took place between the *S.S. Republic* and another ship in the Atlantic Ocean. Frantic calls over the radio from the *Republic* brought rescuers who saved most of the passengers. This dramatic event made front page news

around the world.

Suddenly, radio caught the imagination of millions. Their curiosity led to new inventions that made radio an even more important part of our lives.

CHAPTER THREE

RADIO MEETS THE MASSES

DeForest and the Audion

When Lee DeForest made his comeback, he did it in a big way. For years, DeForest had been working with a device he called the vacuum tube, or “audion.”

The audion was a small glass device in the shape of a light bulb. Inside the sealed glass covering were thin wires and tiny metal plates. The audion was sensitive to certain electrical signals—especially radio waves.

The audion was able to detect these signals and amplify them. This meant that radio waves could be heard more clearly, and over greater distances, than ever before. The tube wasn’t perfect—it was still rather “noisy”—but it was a major advance for the time.

The First Major Broadcast

DeForest wanted to exploit his new discovery. He asked speakers and singers to perform before a microphone to help him achieve better sound quality from his wireless system. Finally, he got the results he wanted. Then he began searching for a way to get the word out about his discovery.

While many trial broadcasts were being made at the time by other inventors, DeForest wanted to make history. He also wanted to make use of the publicity that goes with such a feat. He arranged to make a live broadcast of the Metropolitan Opera Company of New York City. The famed star, Enrico Caruso, was scheduled to sing the lead in an opera the evening of January 13, 1910.

That would be the date of the broadcast, DeForest decided.

DeForest, a smart promoter, arranged a large publicity effort to spread the word of his broadcast. He rushed to set up his equipment near the top row of the opera house in preparation for the grand event. Finally, the first notes of the opera sounded. Caruso's voice boomed across the audience. And from the highest reaches of the opera house,

the sound began its journey across space to wireless sets across the city.

No more than 50 people actually heard the historic broadcast. Many others took notice, however. The event made radio seem like a useful tool instead of a scientific toy.

Sarnoff's New Idea

Radio didn't change much in the next four years. A bold, creative



Opera singer Enrico Caruso was the featured performer in the first major radio broadcast.

approach was needed to help radio become more popular.

David Sarnoff was the man with the right idea. The man who directed rescuers to the *Titanic* was now working for the Marconi Company. Sarnoff was growing bored with the ways that radio was being used. Voice communications had been mastered, but its use was limited to person-to-person conversations. Sarnoff thought this was a waste. He proposed a new idea.

"I have in mind an idea," wrote Sarnoff to his superiors. "The idea is to bring music into the house by wireless."

Today, people take this function of radio for granted. But in 1916, the idea seemed strange. Sarnoff's idea was that radio could serve as a form of mass communication. The idea was not accepted well at the Marconi Company. But it made sense to a man named Frank Conrad.

Music Goes "On the Air"

Dr. Frank Conrad worked for the Westinghouse Company. He was

well known among radio buffs for his work with transmitters. These devices were used to boost radio signals and send them out over great distances. Conrad and his assistants would spend hours talking on the radio with each other. With the aid of a transmitter, their voices spanned thousands of miles.

Radio operators across the country listened as the men talked. Sometimes Conrad would ask the listeners to report on the power of his transmitters. They did so at first, but they grew tired of listening to the same thing over and over again. Then Conrad thought of playing music on a phonograph and sending the signals over the radio.

Conrad's idea was a hit! People actually wrote to Conrad just to ask that he play their favorite songs. The demand was so great that Conrad began to broadcast music each Wednesday and Sunday night.

Conrad soon ran out of new records to play. Then a local music store offered Conrad free use of their records. All he had to do was mention on the air that the records could be

purchased at the store. The first radio commercial was born! And the records played on the radio sold very well.

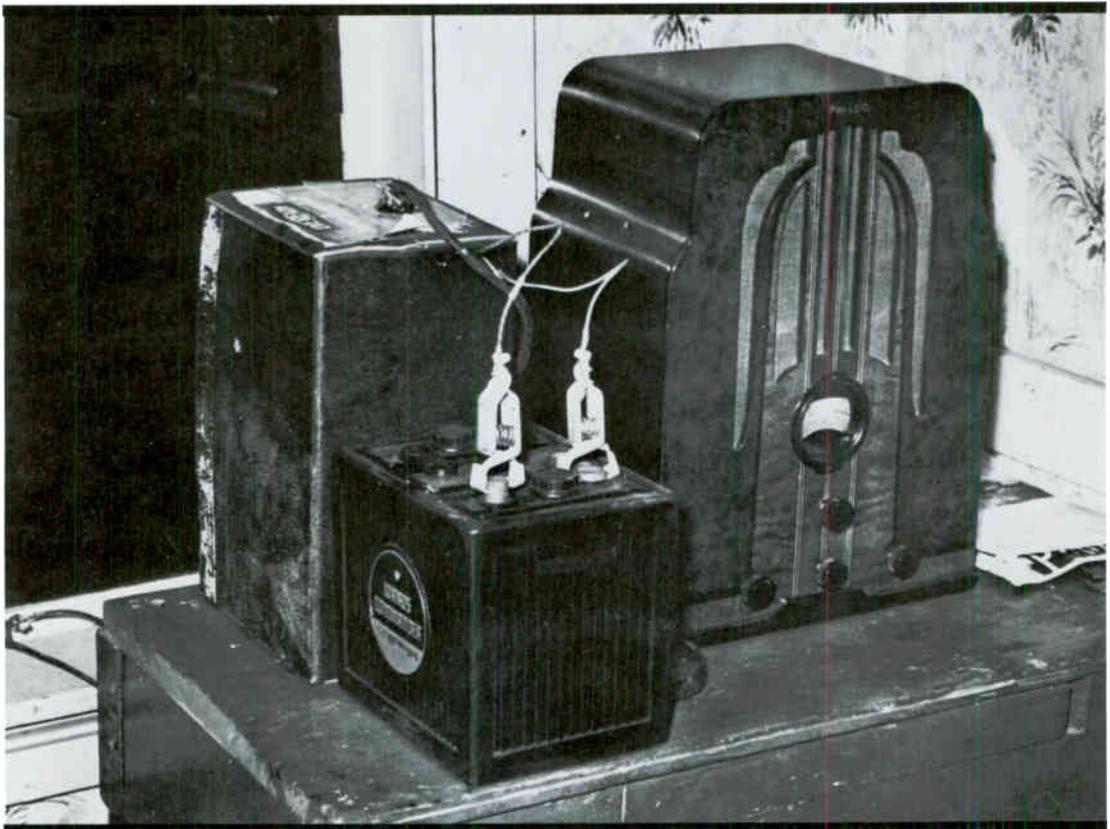
Before long, Conrad began to mix live music in with his recordings. The popularity of his program began to grow.

Conrad's boss, H.P. Davis, took notice and outlined a plan to make home radio receivers. He believed that good radio programs would

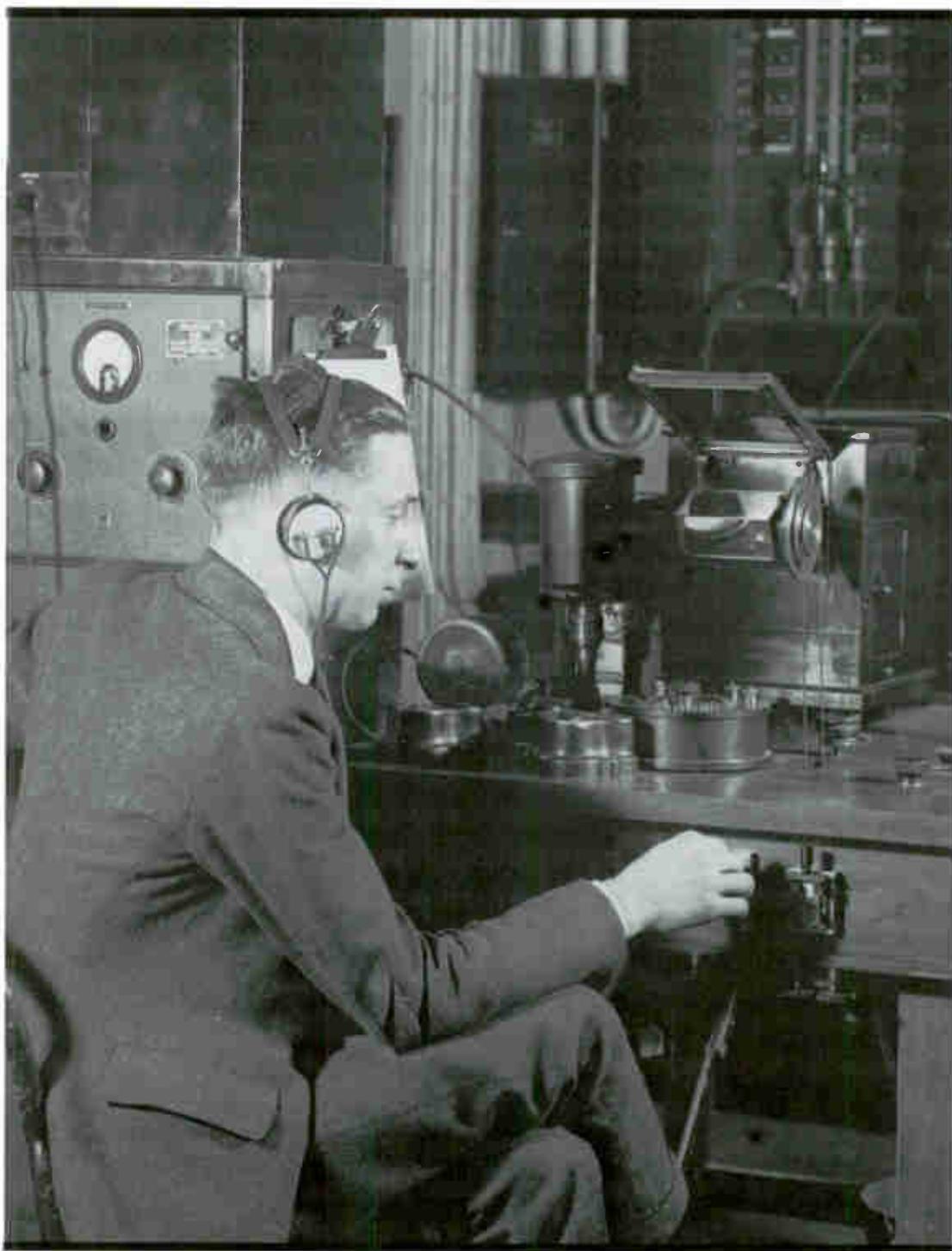
cause people to buy the receivers. Davis and Conrad convinced their company, Westinghouse, to sponsor their plan.

The First Radio Station

Westinghouse quickly agreed and built a broadcasting station in Pittsburgh. By the fall of 1920, the station was open for business. Newspapers covered the event closely, and public



Early radios were big, clumsy machines. If listeners wanted a battery-powered radio in the old days, they brought their car battery inside for the evening!



Early radio stations kept the operator busy. This equipment—although simple by today's standards—was very hard to use and suffered almost constant breakdowns.

interest was high. Station KDKA went on the air November 2, 1920.

The first broadcast was a report on the 1920 presidential election, in which Republican Warren G. Harding handily defeated Democrat James Cox. From a single room in a shack atop a Westinghouse factory, KDKA reached out to radio receivers across the country.

Inside the shack were four men: the radio operator, an announcer, and two men who were on the telephone to the newspaper office getting election results.

The men continued their broadcast from 6 p.m. until noon the next day. The response was tremendous! Thousands of people listened to every word. Within a few days, hundreds of letters poured into the Westinghouse offices. The people at Westinghouse—thrilled by the positive response—decided to do a broadcast for one hour each night.

Early Home Radios

The success of those early broadcasts is surprising. The quality of the

radio equipment was very poor by today's standards. Radios in the 1920's were bulky machines. Some weighed more than 100 pounds! They were a strange maze of vacuum tubes, wires and electrical circuits.

Most radios required listeners to press a small earphone to their heads to hear anything at all. And those who were clever enough to attach a speaker to their radio were not much better off. They were lucky to hear much of anything through the static in the background.

Music was thin and wispy, and the broadcaster's voice was sometimes tinny and garbled. But despite these problems, most people were thrilled by the new technology. Indeed, KDKA's original program is still considered radio broadcasting's first shining moment.

CHAPTER FOUR

RADIO GROWS BY LEAPS AND BOUNDS

The Explosion of Radio

A radio in every home—that was the unspoken goal of many companies who made and sold radio sets in the 1920's. For the most part, they saw their dreams become reality.

In 1920 there were just three radio stations, and less than \$2 million worth of radios were sold. By 1923, however, radio had become an important part of the American home. By the end of the 1920's, 500 radio stations were operating, and sales of radios reached \$136 million!

People across the country had fallen in love with “the wireless.” They wanted to stay tuned in. Companies such as American Marconi (now called the Radio Corporation of America, or RCA) did all they could to help radio grow.

The Radio Companies

Most radio stations were owned by companies who made and sold the radios themselves. The profits from the sale of radios paid for the cost of operating the stations. More and better programs meant that more radios would be sold. RCA, Westinghouse, and General Electric paid millions of dollars to keep their stations on the air. This may have seemed like a big expense, but it put money right back into the companies' pockets.

Some people, like David Sarnoff—who was now the general manager of RCA—did worry about the high cost of operating radio stations. Sarnoff looked for ways to keep these costs down and make radio even more popular.

Selling Time

The answer to Sarnoff's worries was, of course, commercials. In 1922, WEAF, a station in New York City, decided to let businesses "buy time" on the air. The people who ran the station were careful with their decision. They set down strict rules that may seem silly by today's standards. For example, advertisers could have their name mentioned as a sponsor of a program, but they could not actually sell a product. WEAF thought direct advertising was in poor taste.

The idea of selling time didn't take off right away. WEAF made only \$5,000 for all of 1922. But two years later, radio advertising had caught on. WEAF was now able to charge sponsors \$750 for a one-hour program.

Many listeners, even then, viewed commercials as a bother. But sponsors provided benefits, too. The money from such "ads" allowed the stations to produce first-rate programs. WEAF hired the best entertainers—comedians, singers, and

actors—to perform on their programs. Direct advertising was still banned. But businesses were willing to pay "top dollar" to get their names on the air as "sponsors" of radio programs.

The Golden Age of Broadcasting

By 1925 radio was no longer just a novelty. For many Americans, radio was the source of family entertainment. On any given night, millions of people gathered around their radios to listen to the latest news and entertainment programs.

The first radio programs were simple readings of news and weather reports. Within a few years, however, these programs were replaced by full-blown dramatic productions. These shows kept listeners glued to their chairs. First-rate mysteries, comedies, and musical programs were common by the mid-to-late 1920's. And with these successful programs came something new—radio superstars!

Comedians Jack Benny, Bob



Comedian Jack Benny became a sensation on radio. He later was a TV star, too.

Hope, Eddie Cantor, and dozens of others made the jump from vaudeville stages to radio. In doing so, they saw their popularity skyrocket. Within days, it seemed, their fame began to rival that of even the best-loved Hollywood movie stars.

Shows like “Amos ’n’ Andy,” “Fibber McGee and Molly,” and “The Green Hornet” became a big part of American life. Families would gather around the radio each night

and listen to these programs. In fact, when “Amos ’n’ Andy” was on the air, some movie theaters were known to stop their films and turn on the radio! That way the audiences would not miss their favorite radio show.

Better Styles and Sound

As radio became more popular, their makers worked hard to create radios that would become the cen-



Freeman Gosden (Amos, left) and Charles Correll (Andy, right) were the stars of the Amos ’n’ Andy Show.

terpiece of the American living room. Their efforts resulted in beautiful radio consoles—or cabinets—that were almost works of art. And instead of running off a battery, the new radios could be plugged in to household electrical circuits.

The sound quality of radio broadcasts improved greatly. The clumsy earphones, once such a vital part of early radios, were replaced by large, smooth-sounding speakers. For the first time, radio programs sounded almost as good as being there live.

Radios also began to shrink in size. By 1927 the first radio was squeezed into a car dashboard! Within two decades, 50 percent of all new cars came equipped with a radio.

Radio's Impact

By the 1930's the influence of radio on American life was very big. Radios were everywhere, and new radio stations popped up almost weekly. Programs became much more lifelike. When listeners used their imaginations, these programs

seemed all too real at times.

On Halloween Eve in 1938, a radio drama was played out that sent people screaming into the streets! The program was called "The War of the Worlds." The show was based on the H. G. Wells book of the same name. The story of a Martian invasion of Earth was so real and scary that thousands of listeners thought it was really happening.

Producer Orson Welles wasn't aware of the sheer power of his work. Even though Welles warned listeners that the program was just entertainment, people all along the East Coast fled their homes in terror. They were hiding from Martians that lived only in their imaginations!

Others besides Welles saw the power of radio and quickly made use of it. President Franklin Roosevelt broadcast "fireside chats" during the 1930's and early 1940's. His intentions were simple and sincere: he wanted to bring his messages to every American, and radio was the best way to do that.

The war years of 1941-1945 saw the men who broadcast news of

World War II become household names. Reporters like Walter Cronkite, Lowell Thomas, and Edward R. Murrow brought news of the fighting into homes around the world. They kept Americans informed of progress in the war.

By 1950 there were more than 100 million radios operating in the

United States alone. The teenage audience grew quickly as music became the most popular programming choice for many stations.

By the late 1950's rock 'n' roll was "king" of the airwaves. Elvis Presley, Chuck Berry and others owed much of their fame to the wonder of radio.



Orson Welles delivers a radio broadcast—The War of the Worlds—that made people run from their homes in terror!

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CHAPTER FIVE

HERE TO STAY

TV Competes with Radio

The “golden age” of radio began to end as TV took center stage in many homes. Radio audiences remained loyal to some programs, but the days of radio as the major source of entertainment for Americans were numbered.

Radio stations reacted to the threat of TV by decreasing the number of original programs they offered. Instead, they offered other kinds of programs, such as talk shows and music, to keep their audience levels high. For the most part, this plan worked. Radio of the 1960’s was starting to sound like what we are used to today.

Radio networks became sources of news, sports, and other information instead of pure entertainment.

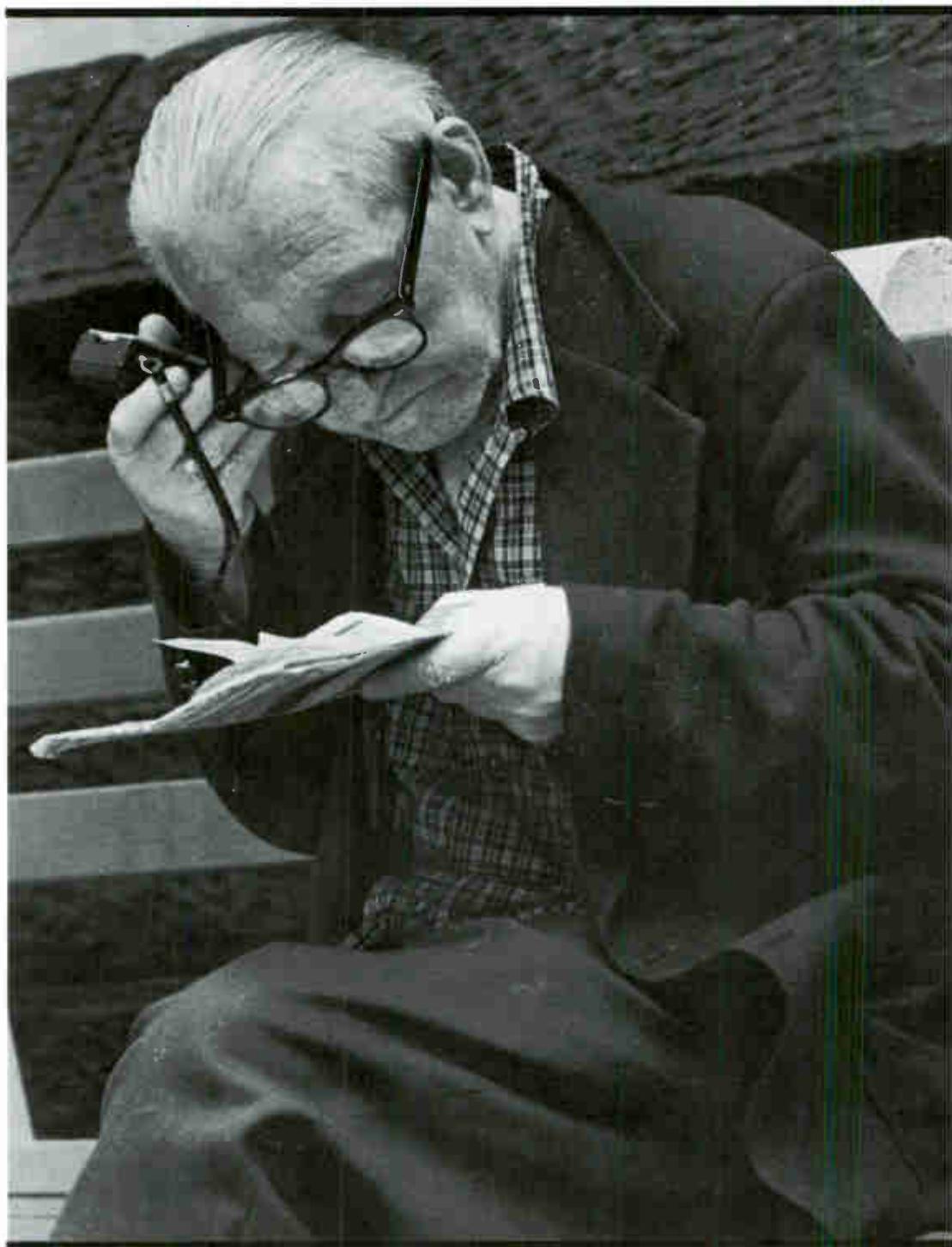
The popularity of networks dwindled as local stations started creating their own programs.

Radio Goes Places!

The radio industry got a big boost in the 1950’s with the invention of a tiny device called a “transistor.” Groups of transistors could be attached to a board no larger than a playing card. They could do the work of the much larger, and shorter-lived, vacuum tubes used in radios. They were also much cheaper to make.

This meant that radios could be made much smaller. Soon they were small enough to fit in the palm of the hand.

Powered by a small battery, a portable radio could be taken anywhere. Radio came out of the home



As radio matured, it became a part of everyone's life. New technology—especially the invention of the transistor in 1951—helped make radio portable.

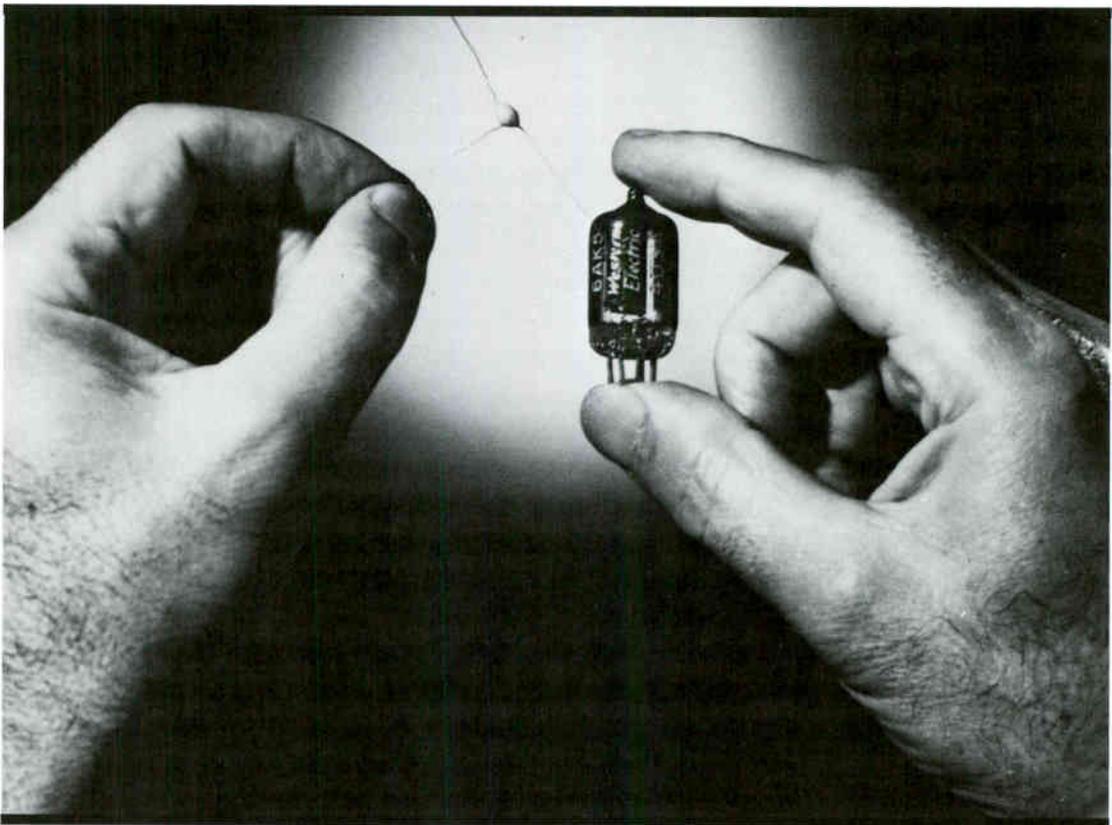
and crept into schools and onto the beach. People could also listen to them at work.

Audiences grew quickly as radio became a carry-along item. This change in listening habits fueled intense competition among radio stations to “win” listeners. The stations with the most listeners could charge more for ads. Radio stations began using contests and other gimmicks to grab listeners.

Radio Today

The golden age of radio is passed, but radio in America is still big business. More than 7,000 commercial stations are operating, and radio remains a big part our lives.

Many stations, large and small, carry out their duties around the clock. Thousands of radio professionals work hard to keep us informed, entertained, and aware.



The transistor (left) made hand-held radios possible. The vacuum tube (right) is rarely seen in electronics these days. Instead, your radio is made up of many tiny transistors.

CHAPTER SIX

AT THE RADIO STATION

The inside of a large radio station is a maze of studios, offices, control rooms, and endless hallways. But the people who work at a radio station know their way around. Their goal is to keep the station running smoothly and to attract as many listeners as possible.

A large audience is what sells advertising. Because ads pay the radio station's bills, every station tries hard to appeal to the largest possible audience.

The audience is measured by companies that keep track of which stations people are listening to. These habits appear as "ratings." The higher a station's ratings, the more it can charge for advertising.

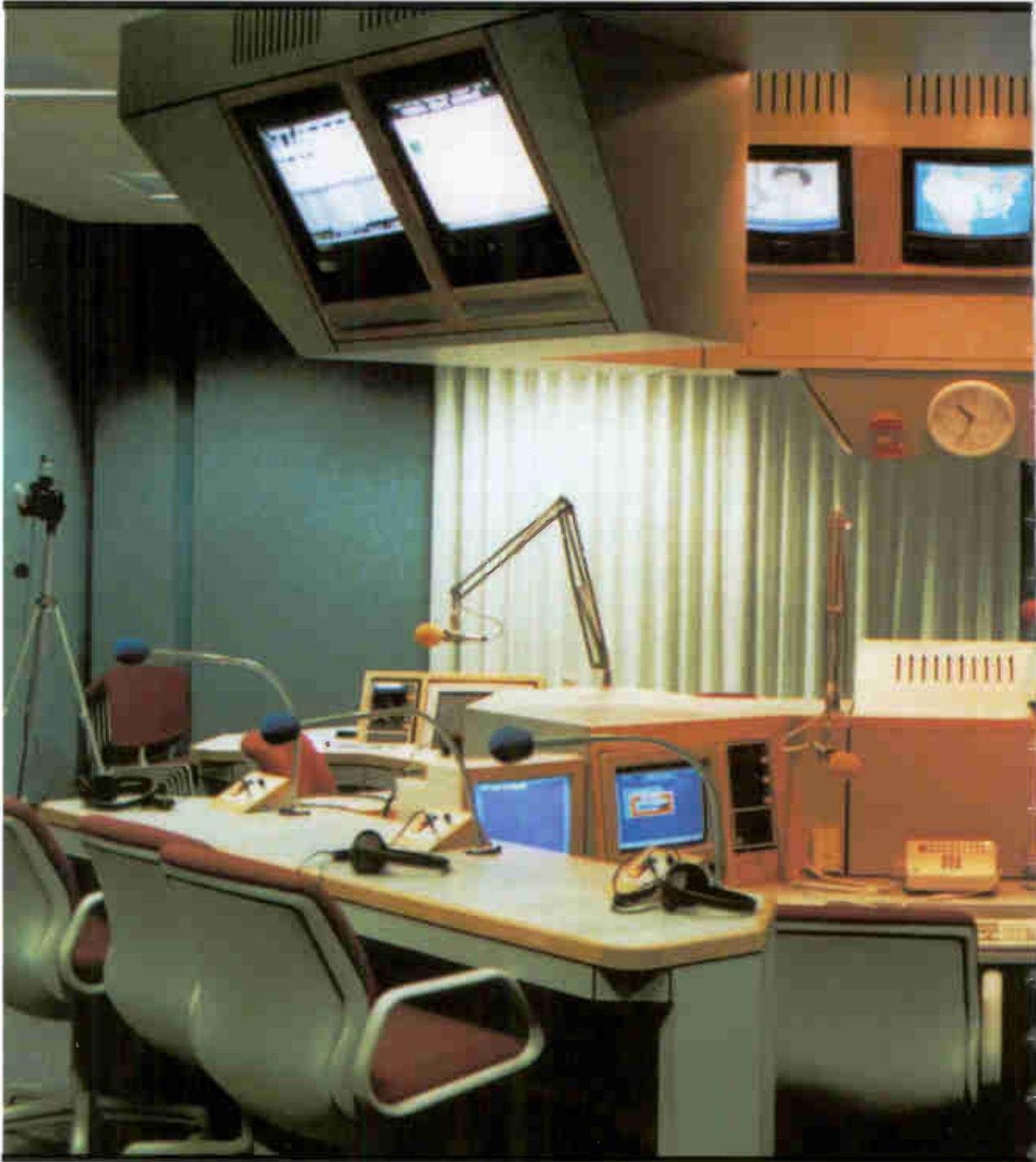
In larger cities there are often so many stations, that keeping a large audience means coming up with a

"formula." Some stations specialize in a certain type of music—country and western, rock 'n' roll, or jazz. Other stations offer their listeners non-stop news or talk shows.

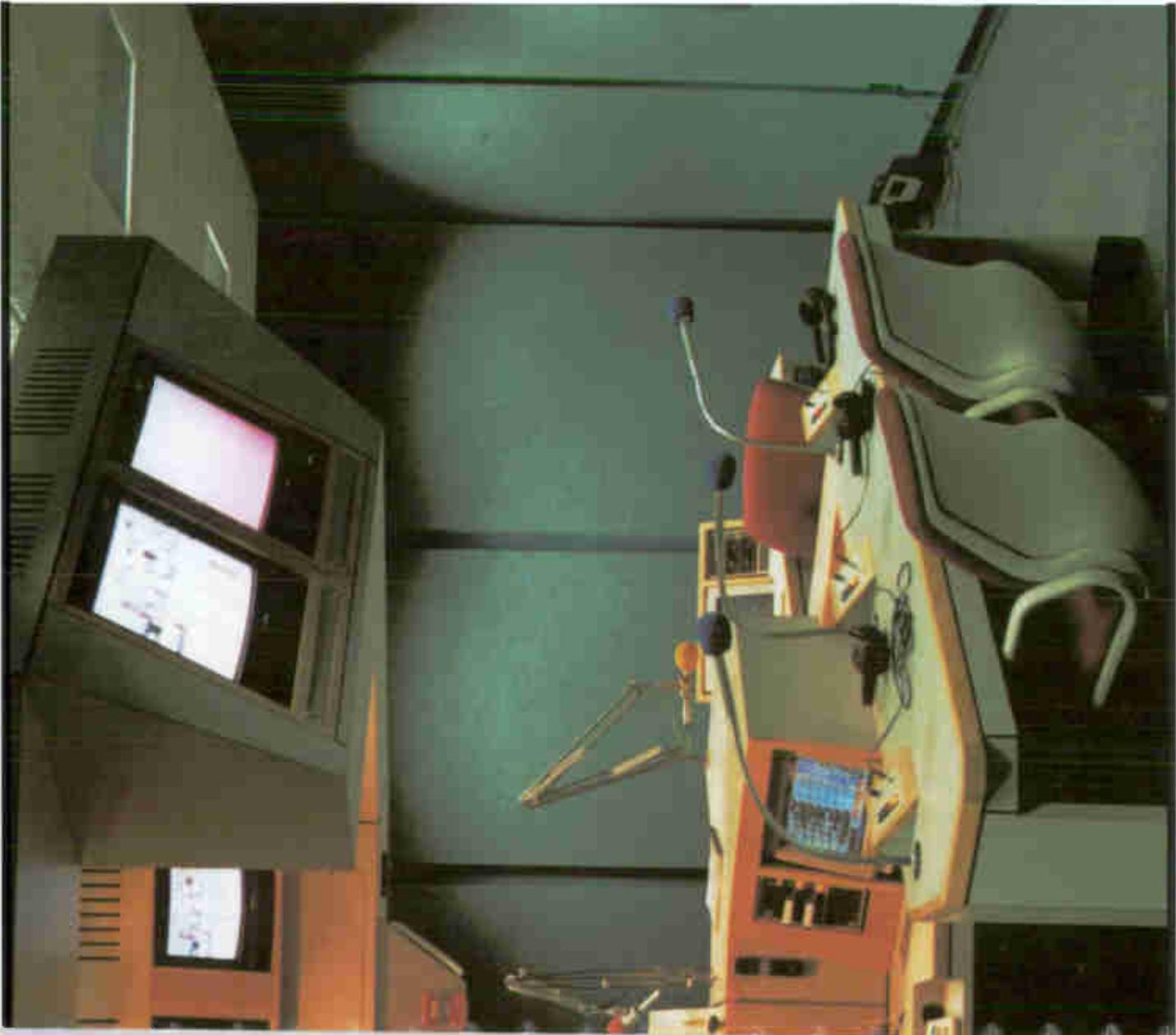
The General Manager

The general manager's job is to make decisions that help make the station successful. Each day the general manager faces countless questions: Should new equipment be purchased? How can the sales staff sell more ads? How much should be charged for each ad? Who should work the morning shift? Is too much time being spent playing music? Is there too much news?

The general manager also deals with finding the right person for each job at the station. He usually shares



This state-of-the-art broadcast studio is located at WCCO Radio in Minneapolis, Minnesota. It even has TV monitors to give announcers the latest information on traffic, news, and weather reports.



such decisions with other top staff members, like the program director and the sales manager. Together, they create a plan to help the station succeed.

The Program Director

The program director, or manager, is the person who decides what goes on the air and when. The program director looks for a mixture of programs and announcers that will grab the listener's attention. This means filling each hour in the day with the people and programs that the audience will like.

The program director is also in charge of the production department, where many of the programs and ads are created.

Many radio programs are created right at the station, but some come from a "network" of stations. A network allows stations to pool their talents and money to provide better programs at a lower cost to each station.

Programs that originate at the station are usually broadcast "live."

In many cases, an announcer will create the program "on the fly," using notes or by following a rough outline. This sort of format is used at smaller stations, where news and music programs are common. Live broadcasts rely on the personality of the announcer to carry the show.

The Sales Force

Ads keep a radio station on the air. That's one aspect of radio that hasn't changed over time. The job of selling ads belongs to the sales manager. At a large station, the sales manager may have more than a dozen salespeople selling ads.

There are three types of radio ads: local, national, and network. Local ads are sold by the station's own salespeople. These ads are usually sold to businesses within the listening range of the station. For most stations, this type of advertising is a majority of their sales.

National ads are often sold to the station by ad agencies. These agencies are hired by large companies that want to reach local audiences.



More and more radio stations are offering live broadcasts to bring in listeners. Note the microphones hanging over this orchestra for use in the broadcast.

The Announcers

Network ads are usually sold in advance by the network for a special program. The network then pays the station to broadcast the program that carries the ads. In this way, the station and the network share the profits.

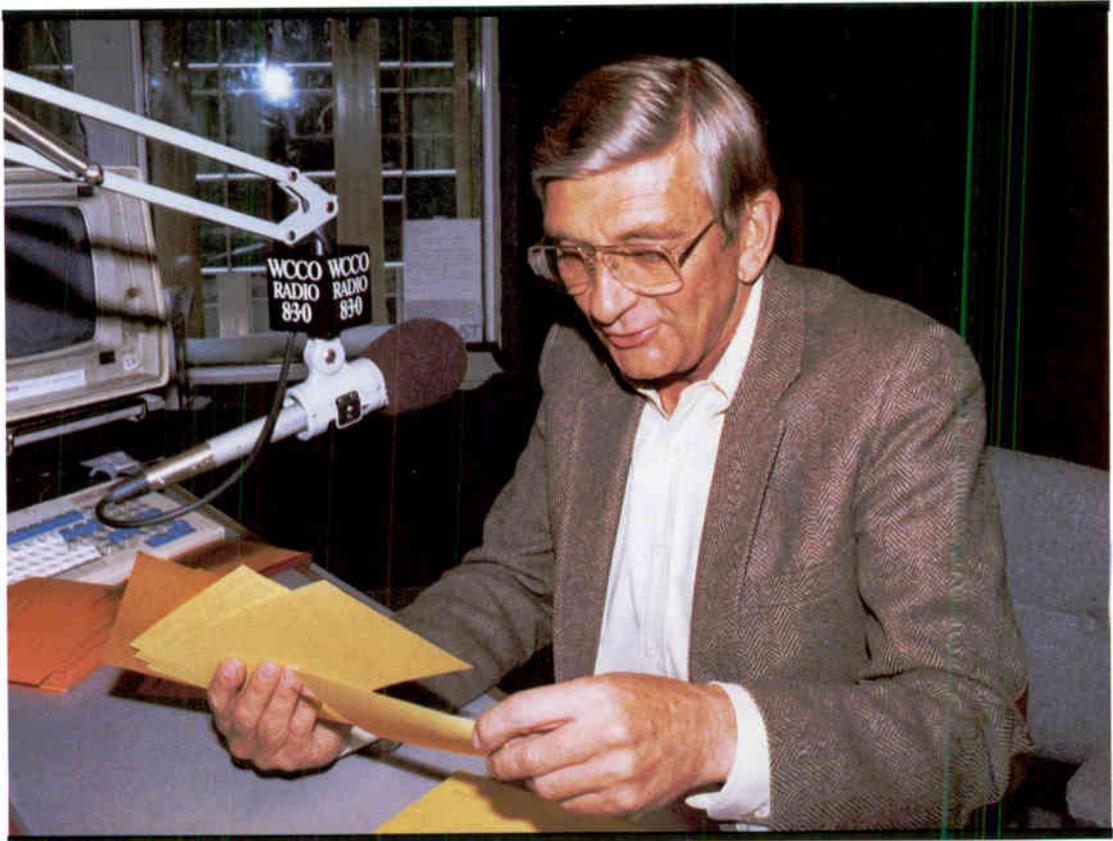
No matter what type of ads are sold, the sales staff works hard to sell as many ads as possible. The more money coming in, the more successful the station—and the sales force!

The most glamorous jobs at a radio station belong to the announcers—or “radio personalities.” Their voices filter out from the station into people’s homes. They are often well-known in the area they serve.

The announcer has a busy schedule each day. However, only a part of an announcer’s day is actually spent broadcasting. Much of the time is



The announcer has to do several things at once in order to make a broadcast go smoothly. It's not as easy as it sounds!



Announcers at WCCO Radio are famous for their interesting conversations.

used to record ads, edit news, and meet with advertisers.

Still, the main part of an announcer's job is to be "on the air." An announcer must be smooth and casual, as though talking with a friend. Radiopersonalities work hard to keep a good relationship with their audience.

The announcer must also be able to deal with problems that may occur

during a broadcast. The basic rule for announcers is to make sure that there is never "dead air." A skipping record can be an announcer's worst nightmare.

The Engineers

The typical radio station is a very complex place. There are many kinds of equipment that need to be main-

tained in order for the station to stay on the air. In addition to powerful transmitters, there are many record players, tape machines, and other “high-tech” devices to look after and service. The engineer’s job is to monitor this equipment.

The engineer also has to run the “control board” for the announcer. The control board is mounted on a desk or counter. It is covered with an

array of dials and switches. These in turn are hooked up to amplifiers, microphones, tape decks, and other machines that help create the sounds that are broadcast. The engineer carefully checks the control board to make sure that the sound quality and volume are correct as the radio signals leave the station.

It’s painfully obvious when the engineer makes a mistake. Dead air



Part of an engineer’s job is to maintain “high-tech” equipment, such as compact-disc players.

or technical errors can ruin an otherwise perfect broadcast. The engineer and the announcer have to work as a team.

Future Trends

Many of the recent changes in radio have been in the area of automation. Some stations now have equipment that allows them to

“program” each broadcasting day well in advance. There are usually no announcers at these automated stations. A manager, an engineer or two, and plenty of advertising salespeople are all they need.

Large radio networks produce “general interest” programs that can be easily adapted to a local station’s format. These programs are recorded in a studio by an announcer. They



While automated stations don't need announcers, they still need a sales force to sell advertising.

may include music, talk, or other types of programs. Once recorded, the programs are often beamed to the automated station by satellite. Sometimes they are sent to the station on long-playing reel-to-reel tapes.

Only a few hundred automated stations are now operating, but the idea is becoming more popular each year.

Other changes in radio today involve the "message" more than the technology. Some people have grown bored with the radio programs offered. "Shock" radio is one alternative. It relies on the announcer to surprise audiences and keep them off guard. Listener participation is often involved. Sometimes the talk between announcer and listener becomes abusive—which may be the intended effect. The Federal Communications Commission, or FCC, is trying to put limits on shock radio programs. These limits, though, have been challenged by supporters of free speech.

Another development is pirate radio, which is illegal broadcasting from a secret location. These unli-

censed "stations" usually transmit obscene or offensive material. Since law requires that radio stations be licensed and operate in the "public interest," the FCC can shut down a pirate station. Its operators can go to jail. Because most people aren't willing to risk that penalty, the number of pirate stations is probably small.

Radio in the Final Frontier

Imagine this: somewhere in the deepest reaches of outer space, a small satellite streaks through the endless black void. At last it reaches the planet Pluto. As it begins its orbit, it turns silently to face its home, which is now millions of miles away. Its battery-powered brain puts together a short message and beams it on an invisible path toward a point that cannot be seen. Many minutes pass as the tiny signal races toward its destination at the speed of light.

On Earth, a man sits quietly in front of a computer. His job is to listen for radio signals from a satellite fired into space many months

ago. A pair of headphones rest gently atop his head. He has been listening to silence for hours.

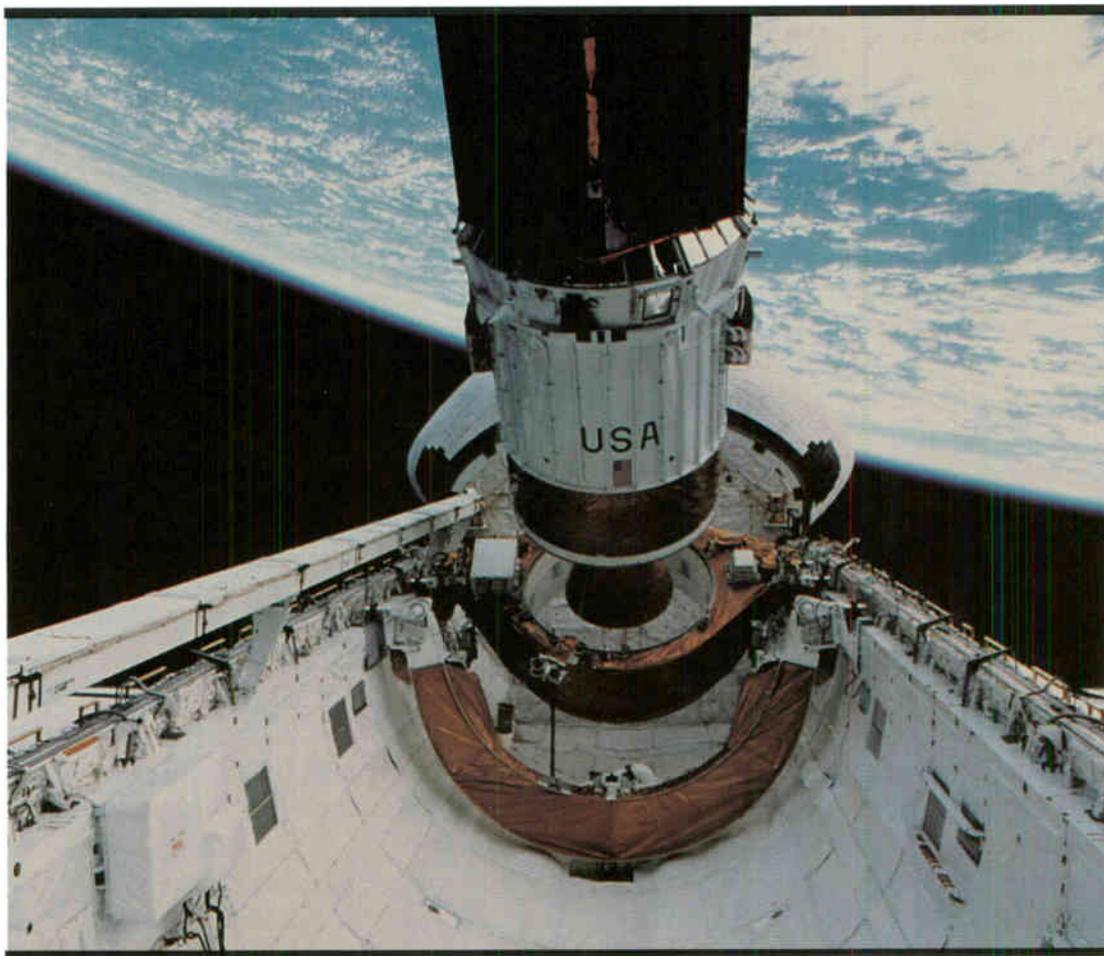
Suddenly the man snaps to attention. His ears detect a faint noise. It grows louder until he finally makes out a message.

“I’ve got it,” he exclaims. “The Galileo Probe has made it!”

The weak radio signal has travelled countless miles through space to report: “I have arrived.”

It’s clear that radio has arrived, too.

The development of radio has brought us into the communication age. What we say and do with this great tool is up to us.



The Galileo Probe—like this satellite launched from a space shuttle—will use radio signals to communicate with scientists on Earth.

GLOSSARY

advertisement—a public announcement about a product or service; a message to inform or persuade.

antenna—a tall metal rod used to send and receive radio signals.

audion—a small glass vacuum tube containing thin wires and metal plates; used to receive and amplify radio signals.

automation—using machines to do the work of humans.

broadcast—to send out news, music, weather or other programs by radio.

control board—a switching device that allows an announcer or engineer to adjust microphones, turntables, volume and other controls that are needed to control a radio broadcast.

current—a term that describes the flow of electricity.

electromagnet—a device made from an iron rod with wire wrapped around it; when electrical current is passed through the wire, the device becomes a magnet.

electromagnetic waves—electrical waves that are sent through space; caused by rapidly-changing electric current.

induction theory—a belief that electrical currents can pass from one wire to another even though the wires are not touching; the induction theory is the basis for the development of radio.

liquid barreter—a device, resembling a light bulb, that could send a steady radio

signal through the air.

magnet—a piece of iron or steel that has the power to attract another piece of iron or steel.

microphone—a device used to change sound into electrical impulses; these impulses are amplified as part of a radio broadcast.

Morse Code—a system of dots and dashes that signify letters and numbers; Morse code was used to send messages along a telegraph wire.

network—a chain of radio stations associated or operated as a single unit.

ratings—a measurement of the popularity of a program.

satellite—a man-made object that travels through space to gather or receive information and transmit it back to Earth.

telegraph—a system of communication that uses electrical signals sent through a wire over long distances.

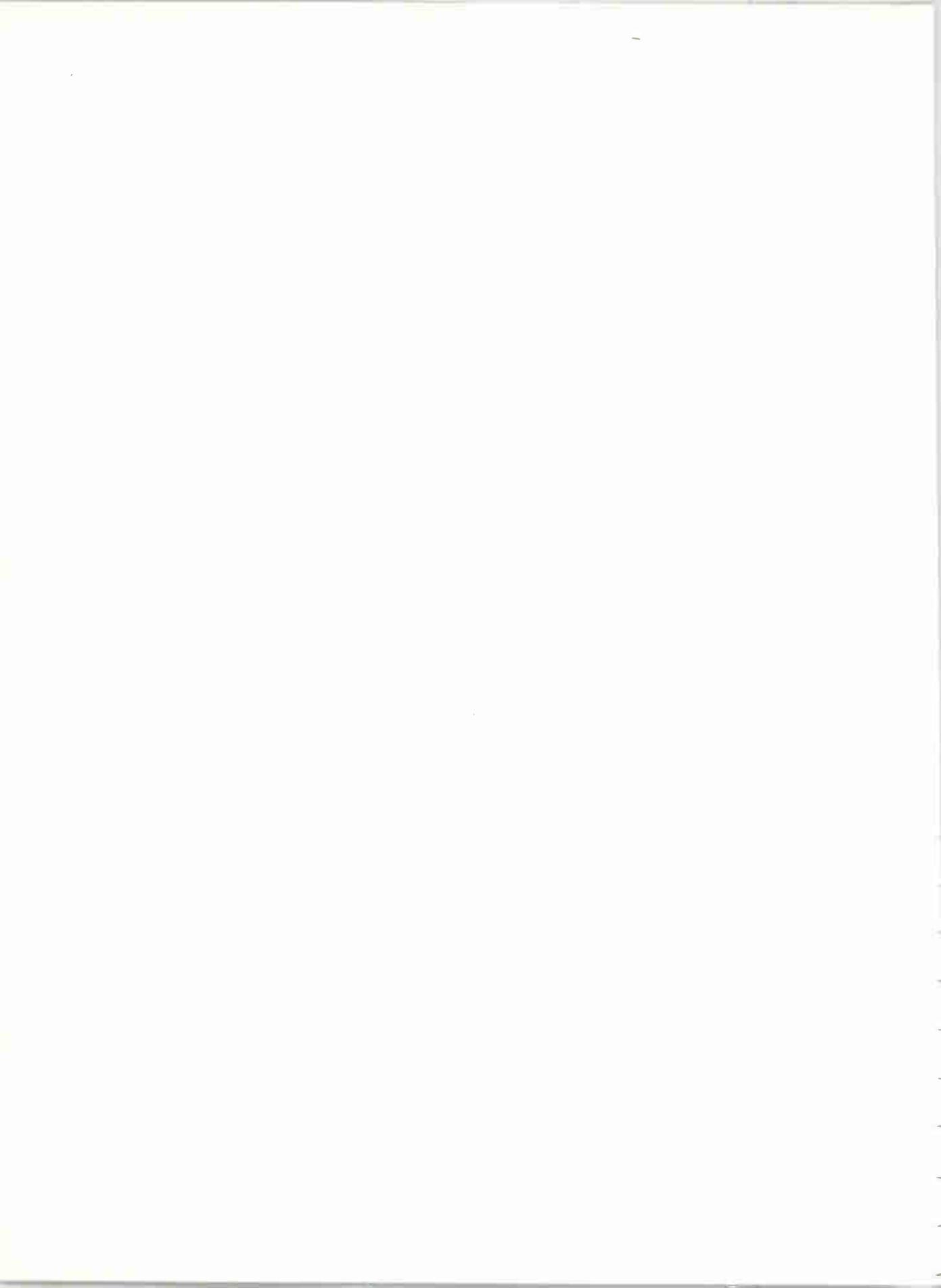
transistor—an electronic device that controls the flow of electrical current; transistors have replaced vacuum tubes in radios because of their small size and reliability.

transmitter—the device that sends out radio signals; the signals travel from the transmitter through an antenna into space.

vacuum tube—a glass tube, containing wires and metal plates, that is used to control the flow of electrical current in a radio or other device.

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RADIO

It is late at night, April 15, 1912. David Sarnoff is bored as he sits in front of a wireless radio set in New York City. Suddenly, he becomes alert. A weak Morse code signal is coming in: "S.S. *Titanic* ran into iceberg. Sinking fast." Sarnoff knows he has to act quickly. After getting more details, he sends off rescue directions to nearby ships.

Sarnoff's efforts—and his radio—saved hundreds of lives. Almost overnight, "radio" became a household word.

This book explains the history and present techniques of one of today's great communication tools—radio.

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