

"AIRY TALES"

by
TEMPLE



The **A.B.C.** of **RADIO**

RADIO . . . *What it Really Is!*

So much romance has been woven about radio, what it is; who discovered it, and how long it has been in development to its present remarkable powers that the time has come to tell the story of radio in simple terms of easy understanding. . . .

Both the radio-wise and those who ask no more of their set than its good performance will have interest in this non-technical recital of how radio came to be.

The story has been prepared by one of the world's great radio engineers and though it avoids discussion of types and details and ignores the lingo of kilowatts, condensers, bypass, controls and other fearsome things of the radio catacomb, it states the facts of radio to make it simple. . . .

The ABC of RADIO

TEMPLE CORPORATION

CHICAGO, ILL., U. S. A.

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PULLING THE SUN TO WORK

A . B . C

OF RADIO

Romance of its Discovery and Development

DO YOU KNOW that Alexander Graham Bell invented radio broadcasting and first used it in 1878?

This is the same Professor Bell who invented the telephone. The famous Bell system is named in his honor. The blue bell symbol of telephony which hangs from every 'phone booth does homage to this inventor who first publicly exhibited his telephone at Philadelphia's Centennial World's Fair in 1876. People marveled at a means of projecting the human voice over great distances, but few saw commercial use in telephony which required more miles of connective wires between instruments, and the telegraph supplied wire communication.

It was this consideration of duplicating wires strung over the country which turned Professor Bell's thoughts into the channel of sound communication, without wires.

So, radio is not so recent a discovery as the common belief, and many pioneer efforts went into its development before Marconi's famous trans-Atlantic results first brought "Wireless" to the public eye in 1901. Bell started the radio idea rolling in his little laboratory in L Street, Washington, D. C., shortly after his invention of the telephone, and it was probably in an effort to avoid what then seemed to be a wasteful duplication of wires, and a doubling of existing in-

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vestment. Like so many other practical inventions which have aided mankind the inventor's urge was practical economy.

A visit to Bell's laboratory at that time would have revealed nothing of what we presently associate with broadcasting. There was a thin highly polished three-wall metallic circular mirror, with a mouth piece mounted in front, while a beam of sunlight was reflected from the rear of the highly polished surface to a room in Franklin College—a respectable distance away.

Professor Bell was seeking a practical use for his telephone and a means for its economical introduction. He transmitted his voice over a beam of light in an effort to do away with the cumbersome and costly wires, necessary to the telegraph transmission business at that time. As he sat and talked into the mouthpiece, the vibrations of his voice were imparted to the thin metallic mirror. This mirror, in turn, vibrated to and fro and created on the reflected beam of light a flickering, which was the exact counterpart of his original voice vibration, which had found its way into the mouthpiece in front of the mirror. His speech was translated into a flickering on an otherwise steady beam of light. The flickerings were then changed back into sound vibrations at the receiving end by means of a small piece of selenium, electrically sensitive to the variations of intensity in the light beams.

Sound Across Spaces

This was radio! Sound was being transmitted across spaces without wires. Professor Bell, however, soon found the sun to be an unreliable source of light. On cloudy days, he had to suspend all his "wireless" activities. He and Mr. Turner, his associate, substituted an electric arc light as the source of the beam and this arc light was then reflected and correspondingly flickered as the announcer projected his voice against the highly polished mirror.

Even with this arc light improvement the trials and tribulations of the infant radio industry had only just begun, for fading became a paramount problem. Every time the weather was hazy, the light beam was absorbed before reaching its destination. Clouds of smoke from a nearby chimney wiped out the conversation, and even the puffs of smoke from the pipe of a passerby temporarily obliterated the transmission.

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INTERRUPTING SMOKE SCREEN

Efforts were next devoted to study of different colored beams of light and their respective penetrating qualities. It was soon discovered that the seven distinguishable colors seen by the human eye behave differently. Red, yellow, orange, green, blue, indigo and violet were all used as the light beam for transmitting the voice flickering. Violet was easily absorbed—blue was a little better, and so on down until red was found to be the best of all. The flickering red beam actually penetrated thin smoke and haze, while the violet beam was completely absorbed.

Many Unseen Colors

The superior penetrating power of red light was undoubtedly the basis which led to its universal selection as a danger signal. A simple test which anyone can conduct consists in gazing at the sunset any hazy or dusty evening. The sun sends out all of the visible colors enumerated simultaneously in a more or less white beam; but the red beam greatly predominates at sunset, because the haze and dust largely absorb the other colors while the red beams come through with almost undiminished intensity.

By way of digression, it should be understood that the human eye is a limited camera. It records certain colors while the ordinary camera lens only records black and white. Scientists have known for years that there are many colors which the eye does not see. For every one of the seven colors that the human eye does record there are thousands of unseen colors which the human eye does not know exist. Above the violets are many color octaves of ultra-violet. Still further up the color scale come many octaves of x-ray colors and so on.

Below the red are many octaves of infra-red lights, and below these are many colored light beams which only manifest themselves as heat. One of the most powerful colored

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rays in sunlight is the ultra-violet. This is totally invisible to the human eye, but its effects are much in evidence in the summer time. It is responsible for powerful photographic effects, sunburn, etc. An ordinary reflecting electrical heater gives forth a powerful beam of colored light below the infra-red. The beam is invisible to the eye but can easily be felt by the hand because it is warm.

The Pioneer Thermophone

Professor Bell knew this and reasoned that if red light penetrated fog and smoke better than violet, then the colors still lower than red should have even more penetrating power. He constructed a radio telephone which employed a beam of heat—a beam whose color was considerably below the red beam. He still employed his vibrating reflecting thin mirror and, as he talked against this, the vibrations of his voice imparted a similar flickering to the invisible beam of heat which went out to his receiving mechanism. This early instrument was called a thermophone, when it was first exhibited at the Chicago World's Fair in 1892; but most of the people who saw it referred to it as a radiophone, for it employed a beam of heat for its transmission and people were familiar with the fact that heat radiated. This was the origin of the magical word "Radio", the name of a thing, a noun whose origin came from a verb.

Bell's radiophone did all that he had hoped for it. It penetrated fog and smoke, and he overcame some of his early obstacles. This heat beam was still absorbed by intervening trees, buildings and other solid obstacles.

The knowledge gained by the study of the heat beams led to further speculation on the laws of so-called transparency. It was argued that undoubtedly the range of colors were infinite—that there were probably thousands upon



THE INVISIBLE VIOLET RAY

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INTERCEPTING SOUND WAVES

thousands of colors above the visible octave and below the visible octave—that probably there were colors still further down the scale below the heat beams that would exhibit even greater penetrating power. Professor Maxwell proved mathematically that these colors did exist. Professor Bell acclaimed them analytically. It remained for Professor Hertz in 1887 to actually discover them.

Here we have easy understanding of the mystical force which was first the Thermophone, next wireless, and now the world wonder—radio. Modern radio waves are actually colored beams of invisible light. These new highly penetrating invisible colored beams discovered by Hertz form the basis of modern radio broadcasting. The early theories were found to be sound for nearly every solid object became quite transparent for these invisible colored lights way down below the red and heat rays. Receiving stations no longer had to be in direct visible line with the transmitter, but could be located anywhere that other conveniences dictated as radio waves travel everywhere and through almost every substance. These new radio beams do not alone constitute the panacea for all broadcasting ills. We are still somewhat limited by their peculiarities. For instance, iron and steel, and all metal in general still absorb and stop these radio waves. Receiving conditions in our large cities where building is of steel construction still leave much to be desired as the buildings act like impenetrable forests.

This drawback is not without its compensation for, were it not for this property of metal, the antenna wire could not intercept and absorb the wave for utilization in the receiver. The antenna is the periscope of the radio set.

Picture what a strange world this would be if we could put on a pair of eye glasses that would translate our present vision from the visible octave down into the radio

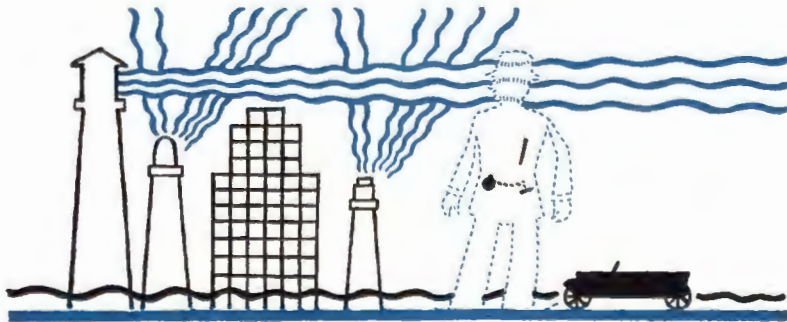
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spectrum. Nearly everything would immediately become transparent, just as window-glass is for our present limited eye-vision. Walking along a main thoroughfare in any large city, we would see positively nothing except the steel girders of buildings, which would stand silhouetted and nude against the sky as if a fire had swept the whole community. An automobile would hurry by seemingly about four inches above a translucent pavement. The tires would be invisible! Metal pencils and gold watches would float by us in the atmosphere as the only visible indication that our friends were close at hand.

The Wonder of Radio

Here and there a huge colored lighthouse would send forth a flickering beam. One would be one color, and another another color. What colors—we do not know as no one has ever seen them. These lighthouses would be the radio broadcasting stations, distinguishable only by their peculiar flickering colors playing between the antenna and the ground—the color determined by the wave-length, and the flickering by the program emanating from within. On the right or left would be a faint series of tints from the sky—dim reflections of the radio lights sent out from distant radio broadcasting stations. These ethereal specters are the only tangible connection between the remote program and the nearby or distantly remote.

Entertaining radio in this atmosphere, one soon loses credulity and blind belief that all things including radio are possible, and instead is imbued with awe for the miracle of radio. The wonder is that we receive anything at all.



STRIPPING HUMANS TO THEIR METALLIC ELEMENTS



Screen grid chassis
Optional equipment
-at no advance in price

THE LOWBOY • *The Temple Console*

World famous engineers built it—master craftsmen created the cabinets—Temple is indeed radio in a 22-karat setting.

Here is featured the smaller of the Temple consoles. These models carry the same chassis, power supply and speaker as the larger models. The specially designed 14-inch dynamic speaker with the exclusive Temple hum control, assures reproduction that you will like—clear as crystal and true. The beautiful walnut cabinet is 40 $\frac{1}{4}$ " high—ideal where a small receiver is desired, yet carrying with it all the beauty and tone of the larger models.

8-60 Standard Model, using six 227's, two 245's and a 280 rectifier tube.

8-61 Screen Grid Model, using two 224's, four 227's, two 245's and a 280 rectifier tube.

Price \$149.00, without tubes. (Prices slightly higher west of the Rockies.)

TEMPLE
TEMPLETONE  *Radio*



Screen grid chassis
Optional equipment
-at no advance in price

THE HIGHBOY *The Temple Grand Console*

Temple is more than a name. It signifies a tone perfect in purity of reproduction—an acoustic realism established after years of successful manufacturing.

Here are the larger of the Temple consoles. In these exquisite walnut cabinets are combined the Temple chassis, power supply, and the specially developed 14-inch humless dynamic speaker. They are ready for operation when tubes are inserted and after light socket, aerial and ground connections have been made.

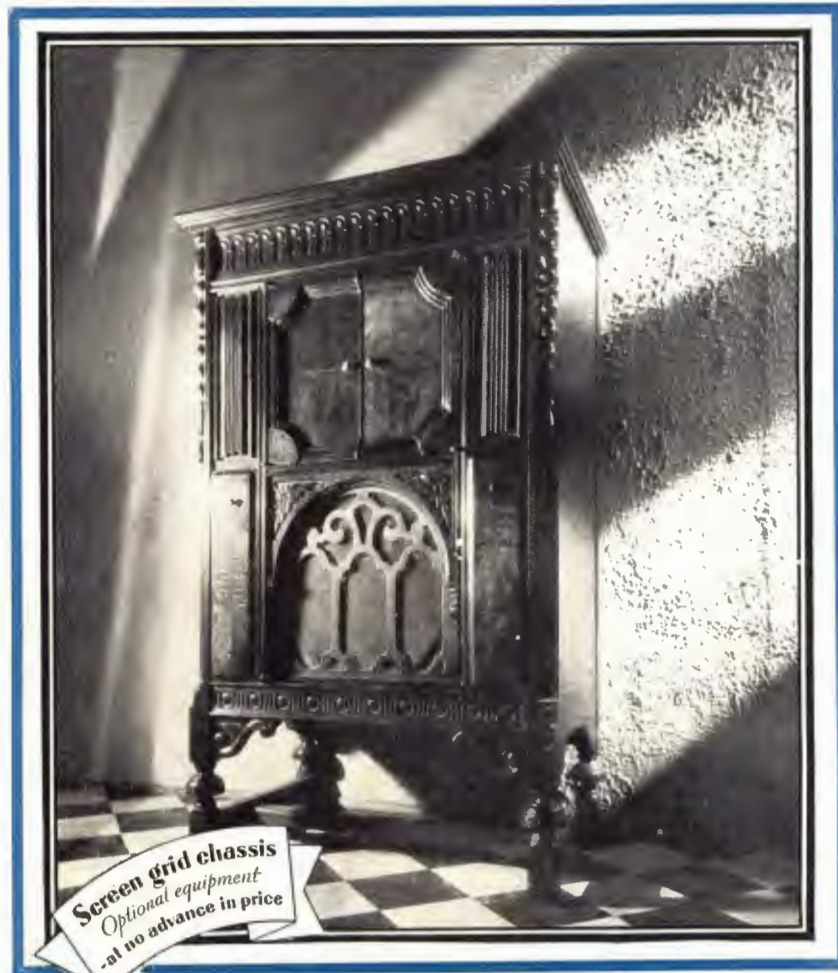
The doors swing, yet do not extend beyond the width of the cabinets, giving them the appearance of open-faced consoles.

8-80 Standard Model, using six 227's, two 245's and a 280 rectifier tube.

8-81 Screen Grid Model, using two 224's, four 227's, two 245's and a 280 rectifier tube.

Price \$189.00, without tubes. (Prices slightly higher west of the Rockies.)

TEMPLE
TEMPLETONE  *Radio*



Screen grid chassis
Optional equipment
-at no advance in price

THE COMBINATION *An extraordinary musical instrument*

The Temple radio-phonograph combination models offer you not only the finest in radio receivers but also allow for the recreation of phonograph recordings—all with a tone so beautiful and acoustically correct that it entralls you. It is double-barreled, you might say. A flip of the switch and the broadcast stations roll in—another flip and your phonograph records are reproduced in the most pleasing manner.

Housed in a most beautiful walnut cabinet, is entirely self-contained—carrying in addition to the Temple chassis and speaker, the full equipment for electrical record reproduction, including storage space for records. These models are 46½" high.

8-90 Standard Model Radio-Phono. Comb., using six 227's, two 245's and a 280 rectifier tube.

8-91 Screen Grid Model, Radio-Phono. Comb., using two 224's, four 227's, two 245's and a 280 rectifier tube.

Price \$289.00 without tubes (Prices slightly higher west of the Rockies)

TEMPLE
TEMPLETONE  *Radio*

TEMPLE SPEAKERS

DYNAMIC—Temple Dynamics, with their background of unequalled engineering and manufacturing skill, are available in four table models—to take care of practically every current requirement. The exquisite housing, the artistic grille and the compelling eye appeal are the same in all models.

In four table models: Model 2, 110 volt A.C., 60 cycle; Model 4, 110 volt Direct Current; Models 6, 6 volt D.C., battery type; Model 0, 110 volt A.C., 25 cycle. Price—\$39.00

MAGNETIC—Temple Model 5 Magnetic Speaker fills the demand for a quality reproducer, where the tone of the finest speakers is demanded, but where the matter of insufficient receiver power or taste makes the purchase of a dynamic speaker inadvisable.

Temple Model 5 Magnetic is encased in a genuine walnut cabinet—truly a masterpiece of harmony in its artistic and dignified lines.

Even the most critical will acknowledge its faultless design.

Price—\$20.00



Housed in beauty, the Temple Dynamic is the only speaker with the adjustable hum eliminator feature. Separate table type speakers are available for those who do not own a Temple Receiver

\$39.00 for the Dynamic Speaker, \$20.00 for the Magnetic Speaker. Prices slightly higher west of Rocky Mountains