

A New Era In Wireless

What Is Being Done With the Radio Telephone By Way of Broadcasting News, Music and Sermons

By L. H. Rosenberg

FOR years commercial stations have been using the wireless telegraph successfully and amateurs, experimenting with the art, have spent hour after hour on this interesting subject. The mystery of the dots and dashes received from the ether after having traveled hundreds of miles, has interested thousands, and many boys and even grown men have painstakingly spent hours in order to master the wonders of radio and to learn perfectly how to send and receive code messages.

But now there is a new era, and we have radio in a new rôle. No longer is this fascinating subject confined to the expert, for today all may enjoy its many benefits. Radio telephony has developed to such an extent that one does not need to be an expert to receive the messages of the air.

From many plants all over the United States music and actual talking can be picked up as broadcast from efficient broadcasting radio telephone stations. One of the most successful of these stations is the experimental broadcasting station of the Westinghouse Electric and Manufacturing Company at East Pittsburgh, Pa. Concerts are given nightly from this station and they are heard over an area of three million square miles. In this territory there are hundreds of thousands of persons who hear these concerts. The programs for the evenings usually consist, in the main, of phonograph music and national and international news. The great success of this scheme which is attracting wide attention, is the care taken in the selection of the program. For instance, a careful study has been made of phonograph music. Records which sound exceedingly well when played on the ordinary talking machine may be entirely unsuited for this character of music. The best records are tenor and contralto solos and it has been found that instrumental music such as the xylophone, saxophone, the accordion and the cornet are very clear. The program for each night is carefully considered and a selection is made of instrumental and vocal, classical and popular.

Not only is phonograph music transmitted from this station, but the sending out of a complete church service is the feature of each Sunday night. In the church

and pulpit of the Calvary Episcopal Church of Pittsburgh are installed several transmitters. These transmitters are connected to a private telephone line which runs to the radio station seven miles from the church. When the choir sings, or the rector preaches, these transmitters respond to the sound waves and the music or sermon, as it may be, is transmitted to East Pittsburgh via the telephone line. There it is broadcast by means of the radio apparatus, thus allowing thousands of people to hear the service in their own homes. Think what this means to many people: the invalid, unable to go to church can enjoy its benefits without leaving his bed or wheel chair; the farmer, too far from town to go to church has the service brought to him; and the sick in the hospital are encouraged to get well by the wonderful words of the preacher. It is marvelous, this transmitting of church services by radio. One can almost imagine being in church. The blending music of the sixty men and boys lifted in song and the ring of the deep-set voice of the preacher all make the service seem realistic.

So many of the innovations with radio have proved successful that the possibilities of the radio broadcasting plan seem unlimited. When Herbert Hoover visited Pittsburgh to tell his story about the starving children in Europe, arrangements were made for sending this appeal broadcast by radio. A special speech was not necessary. Immediately in front of Mr. Hoover at the dinner, held at the Duquesne Club, was a transmitter. It was arranged in such a manner that it was unseen by both Mr. Hoover and the audience but this did not prevent it from working perfectly. Instead of making his plea to one or two hundred men gathered at dinner, Mr. Hoover was able to reach thousands of people who stayed at home listening to their wireless receiving sets.

A short time ago Prof. Vladimir Karapetoff, professor of Electrical Engineering at Cornell University, who is also a noted musician, gave a lecture piano recital at the Westinghouse Club. Although this event was held in a large hall, the attendance was limited. Here was wonderful music and a discussion of the great com-

posers, which were limited to hundreds—that is it would have been limited to hundreds if it had not been for the wonder of radio broadcasting.

Besides the transmission of the concert music, the church service, the speech of prominent men, broadcasting of a more material nature is forthcoming. The farmer can receive the crop report at the present time; this is sent from Washington, D. C., and the tired business man can get the high points of the latest news. When he gets his morning paper, if he lives in the city he reads more about the happenings given in brief the previous night by radio.

And let us predict further. When the radio broadcasting has reached a higher stage of development and is more fully utilized, the benefits will be enormous. It will be like a three-ring circus. If you look in one direction, you see clowns performing antics, or you may see acrobats, chariot races and what-not.

Soon in radio you will be able to get popular music if you desire, or classical music, or church service, or speeches, or crop reports or news. These will all be sent out at the same time and it will merely be a question of "looking in the proper direction" for the reception of your choice. This will be accomplished by transmitting in what is known as "wave lengths."

One wave length will convey one kind of entertainment, and another wave length will convey another kind. By a simple adjustment of the receiving apparatus, any wave length reception may be selected.

The apparatus necessary to receive this radio broadcasting is exceedingly simple and can be purchased from a few dollars up, depending on the quality of reception desired and the distance from the broadcasting station.

The original idea of the necessity of the telephone headset has been bettered and now by the addition of a loud-speaking horn to a good set of apparatus, many can hear the broadcasting from the same outfit.

Although much has been done with respect to these radio telephone experiments, in a few years we will wonder that we were ever able to exist without enjoying its many benefits.

Correspondence

The editors are not responsible for statements made in the correspondence column. Anonymous communications cannot be considered, but the names of correspondents will be withheld when so desired.

That Non-Skid Horseshoe Prize

To the Editor of the SCIENTIFIC AMERICAN:

In your paper for March 19, 1921, you published a communication from George Foster Howell, on page 227 of the SCIENTIFIC AMERICAN, showing that our Association is offering \$500 for the most satisfactory non-slip horseshoe or device. Mr. Howell writes me that he distinctly wrote \$1,000. It strikes me that if you could manage to give the space it would be well to give the following details of the competition:

1. The competition is open to all without restriction.
2. The Association reserves the right to reject any or all designs submitted and to make final decision on award.
3. A committee of three, appointed by the President of The American Humane Association, composed of one prominent veterinarian and two practical horsemen, of large experience, will examine the designs submitted and report on the same with recommendations to the Association.
4. The design may be submitted by means of drawings or a model, or both. A description should accompany each design submitted, stating in detail the merits claimed for the invention, the materials used or proposed to be used in its construction, and its estimated cost. State whether or not the invention is in actual use or has been tested, and the results as to wearing record, non-slipping qualities, and other advantages. Such descriptive matter should be typewritten.
5. Each sheet of drawing and each model and all descriptive matter shall be unsigned, but shall bear a device, number or motto for identification; and the same device, number or motto shall be placed on a sealed envelope containing the competitor's name and

address. This will not be opened until the award has been made. In making the award, the cost of the device, its wearing qualities, and all other points of merit will be taken into consideration, in addition to its non-slipping qualities.

6. Drawings and models with the accompanying envelopes must be securely packed or wrapped and delivered at the office of The American Society for the Prevention of Cruelty to Animals, Madison Ave. and 26th St., New York, before 6 o'clock P. M., July 1, 1921.

All inquiries regarding this competition should be addressed to

DR. WILLIAM O. STILLMAN,
President The American Humane Association, 287
State St., Albany, N. Y.

How Does a Cat See in the Dark?

To the Editor of the SCIENTIFIC AMERICAN:

I noticed the other evening in a fairly well lit up room a cat sitting near the door waiting for it to be opened so that she could go out. There was nothing in particular about the door to see or for the cat to concentrate her mind on except merely to want to get out, so that she could not have experienced any eye strain. A cat's eyes, in good light, are of a yellowish color. This particular cat appeared to have black eyes, and that is how I came to notice her in particular.

Observing a little closer, I noticed that the darkness of color in her eyes was due to a complete opening of the iris diaphragm. In a cat's eye the diaphragm opens more than in eyes of some other animals, including the human eye, so that I would judge in the language of photo-optics that the aperture in the eye of this particular cat was approximately F-1.

I am certain that the diaphragm aperture in the eye of the average man would, under the same conditions of illumination, be approximately F-4. Inasmuch as the amount of light that entered the cat's eyes would therefore be sixteen times more than would have entered the man's eyes, it probably indicates a retina sixteen times less sensitive. If this is so, how can her catship see in the dark where a man cannot. It may be said that a cat's eyes are more sensitive to perhaps the infra-red rays, or perhaps she sees by them alto-

gether. This, however, appears doubtful, for the reason that artificial illumination is particularly rich in these infra-red rays in which the cat found it necessary to absorb much more light than a man would. This cat further proved that if she opened her diaphragm to full capacity under such good light she must have had little or no further resources in a comparatively dim light, and therefore, could not see nearly so well as a man could in a similar dim artificial light.

Under the circumstances above described the cat must have seen objects also much wanting in focal definition.

New York.

A. F. SHORE.

Electromagnetic Waves in a Moving Magnetic Field

To the Editor of the SCIENTIFIC AMERICAN:

Gilbert showed that the earth is a great magnet, Faraday that every magnet is surrounded by a "field of force." As the earth is a "body in space" and is known to have a magnetic field it seems reasonable to suppose that the other bodies in space have such fields. Eclipse observations indicate that this is true for the sun. When Maxwell proved that light was an electromagnetic phenomenon I thought a moving magnetic field should affect it, that light in passing among the bodies in space would not move in straight lines on account of their magnetic fields. To test the theory a special form of interferometer was designed and ordered from Gaertner of Chicago. It divided a beam of light into two paths at right angles. In one path a powerful rapidly revolving magnet was placed. As the light was affected the results were published years ago in *The American Journal of Science*. As recent eclipse observations appeared to show that light was affected in passing near the sun, Einstein's theory that the effect is caused by the attraction of the sun's gravitational field is receiving much attention from your readers. It is therefore desirable to bring my forgotten theory and experiments to their attention, for some, at least, of the observed deflection is due to the sun's magnetic field.

Boston, Mass.

WILLIAM ROLLINS.