Television made its initial demonstration, using a ten-foot screen of the regular program in a demonstration for the local radio dealers, for those same people, after witnessing the demonstration. Visit the radio stores and inquire about "television attachments" and "television receivers," and delay the purchase of new radio sets with the intention of waiting for the arrival of the promised miracle.

The Sanabria Set-up

The set-up on the stage is simple. The transmitting apparatus, which comprises an arc light, a scanning disc, photo-electric cells and audio amplifiers, occupies one end of a glass-enclosed studio, with a small piano, a microphone stand and some chairs at the other end. Two men attend the equipment, one at the scanner and the other at the amplifiers. The studio is about fifteen feet long, seven high and seven wide, and is of the usual soundproof construction. Its contents are visible to the audience.

After a preliminary spiel, the announcer and two or three entertainers enter the studio, the theatre is darkened, and the scanner turned on. A dim light that does not affect the photo-electric cells is left shining in the studio, just to show the audience that everything is on the level.

At the Broadway Theatre the studio was lowered a few feet into the stage by a disappearing elevator. Then a ten-foot square glass screen just behind the studio was uncovered, and the image of the announcer appeared in a bluish green light, filling the entire screen. Voice accompaniment came through an ordinary theatre sound system.

Now the writer has seen every open television demonstration of importance during the past five years, and he is in a position to state that Sanabria's这套装

"Broadway" Announcing

The theatrical people, having discovered an ace drawing card in television studios, are ballyhooing it extravagantly. Unfortunately, they are leaving many things unsaid, and they are only compoundng that confusion that now plagues the potential radio-television market. If the press-agents and spotlight seekers would keep off the stage and allow Sanabria himself or some competent lecturer to deliver a sane and simple explanation of the works, the effect on the audience would be better and the whole stunt would look more like the genuine scientific exhibition it is supposed to be.

When the time-counter points to a ten-foot screen and a ten of machinery, and makes the remark that television will soon be in the home, he is certainly misleading his listeners. He is also making things unpleasant.

Parts of the Transmitter Equipment

Ulysses A. Sanabria, designer of the equipment, is shown in front of the immense eight-stage audio amplifier used to step-up the tiny output of the photo-cells. At the right is the photo-cell frame with its reflector equipment.
Hits Broadway

appearance in the theatre when
screen was put on as a feature
New York vaudeville house

Hertzberg to make comparisons. He would take the Sanabria images, projected on
a large screen with a 45-degree disc, as "pretty good." They were clearly recognizable throughout a 2000-seat theatre, and thus they probably fulfilled their purpose, although their illumination was not particularly bright. They are neither the best nor the worst large screen images exhibited to date; they are highly creditable.

The Sanabria system is unique in its method of scanning. The disc has only 45 holes, but these are arranged in three spirals of 15 each, each spiral covering 120 degrees of the disc, as shown in Figure 1. The first hole of spiral 1 sweeps across the very top of the subject, and the fifteenth sweeps across the bottom, not the very bottom, but a distance above it equal to the height of two holes. The concentric scanning sweeps do not overlap exactly, as in ordinary disc scanning, but are separated a distance equal to the height of two scanning holes. Thus one third of the entire surface of the subject is scanned in one third of a revolution of the disc, which rotates at 900 r.p.m.

Scanning System

As the disc continues to rotate, the first hole of spiral 2 travels across the subject, starting directly under the arc traversed by the first hole of spiral 1. The second hole of spiral 2 starts just under the second hole of spiral 1, and so on down the subject until the fifteenth hole of spiral 2 has passed under the path cut by the fifteenth hole of spiral 1. Two-thirds of the subject's area has now been covered.

The first hole of spiral 3 then scans the remaining space left blank between the first and second holes of spiral 1. Progressively down the subject the holes of spiral 3 scan the last third of the surface, until the fifteenth hole of spiral 3 scans across the very bottom limit.

At the receiving end, the process is the same, the scanning disc re-creating the image in the same manner that it was broken down.

Since all three scanings take place in the total time of 1/15 of a second, they impress the eye as a single composite action. The eye's well-known characteristic of persistence of vision makes this possible.

Mechanical Precision

The successful operation of the Sanabria system as it is being demonstrated on the stage seems to be due to the precision of the mechanical members, and also to the sensitivity and power, respectively, of the photo-electric cells and the projector lamp. The arc light and disc mechanism of the transmitter are set up on a massive cast-iron stand about four feet high. The base is fitted with leveling and locking screws so that the whole unit will stay put in any desired position. The transmitting disc is small, being only about sixteen inches in diameter. The rays of scanning light that come through it are not thrown directly on the subject, but are reflected by a 45-degree mirror through a square opening in a seven-foot-high frame holding eight photo-electric cells. This arrangement is very convenient for the operator, as it allows him to see the subject at all times and to make any necessary focusing adjustments on the scanning rays.

The side of the disc facing the reflecting mirror is fitted with a revolving turret carrying four different lenses. The operator selects the best lens for the particular subject being televised.

The photo-electric cells are about the same size as ordinary receiving tubes, but they are given a formidable appearance by the highly polished reflectors in which they are mounted. The active sides of the cells do not face the subject, as most people seem to think, but are turned inward and are placed at the exact focal of the reflectors. Thus the scanning rays from the arc and the disc fall upon the subject, are reflected in varying degrees (Continued on page 712)
Television Hits Broadway
(Continued from page 655)

of strength into the polished reflectors, and create weak currents in the photo-electric cells in accordance with the graduations of tone on the surface of the subject.

Figure 1. A triple-spiral system of scanning is used. In the projector disc each "hole" is actually a two-inch lens

The scanning ray is directed on a small mirror, by which it is reflected, through the square hole in the photo-cell frame, onto the subject being televised. The engineer is here shown adjusting this scanning mirror.

The output of the photo-electric cells is amplified by an eight-stage audio amplifier terminating in an output stage con-
there is no radio transmission problem, and the images are free of the phantom snowstorms and other ghostly effects produced by stray bits of radio interference. A frequency band about 50 kilocycles wide is covered by the transmission.

The projector is a piece of machinery worth seeing. The disc is three and a half feet in diameter, and is driven by a five-horsepower synchronous motor. It is fully enclosed for the protection of everyone concerned. Instead of having mere holes, it is fitted with 45 lenses, each two inches in diameter. Directly behind the disc is a Taylor projector lamp. The exact construction of this lamp is something of a secret, but it is known to contain a mixture of helium and carbon dioxide and draws an emerging current of one ampere at 120 volts from the audio amplifier.

The whole projector unit stands about six feet high and is raised on a wooden platform so that it projects an even image on the back of a translucent glass screen ten feet square. The distance between projector and screen is about eighteen feet. The projector is not visible to the audience, although the flickering light of the lamp can be discerned faintly through the screen.

The man traveling with the apparatus are good fellows, and will probably be glad to show you the very interesting projector if you identify yourself as a radio man and make the necessary arrangements at the stage door.

The designer of all this equipment is Ayliss A. Sanabria, a quiet and modest young man of only 25. He has been doing independent television research in Chicago for about five years and has built several transmitters for Chicago stations. He supervised the New York demonstrations and will travel with the apparatus to make sure that he continues to work.

The writer sat through a complete show with Sanabria at the Broadway Theatre while he directed the operators by telephone from a balcony seat, and he was impressed by his earnestness and evident knowledge. The man has been devoting his life to television, and he is only just starting

Radio Science Abstracts
(Continued from page 700)

used to control traffic. Some systems utilize photo-beads in conjunction with tube amplifiers and one system utilizes the time constant of a condenser-resistor circuit to control the traffic lights. The tendency evidently is to arrange these circuits so that the method now in general use of turning lights on and off at specific intervals without regard to traffic conditions can be eliminated in favor of control systems that are responsive to traffic conditions. The article reviews the systems of a number of companies making traffic-control devices.

A Correction

In the article on the City Antenna Problem in the December, 1931, issue on page 590 the value of the terminal resistance was shown as 100 ohms. The correct value is 1000 ohms.

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