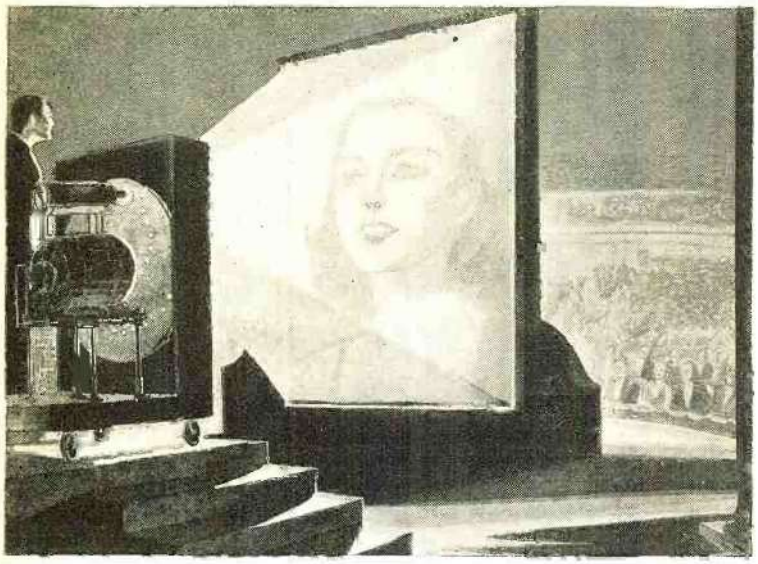
TELEVISION



THE PROJECTOR EQUIPMENT

The television projector was mounted on the stage, behind a ten-foot translucent screen. Loudspeakers, for the reproduction of the sound portion of the program, were located at the base of the screen

Television made its initial
a demonstration, using a ten-foot
of the regular program in a

By Robert

ant for the local radio dealers, for those same people, after witnessing the rather impressive 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 entire 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

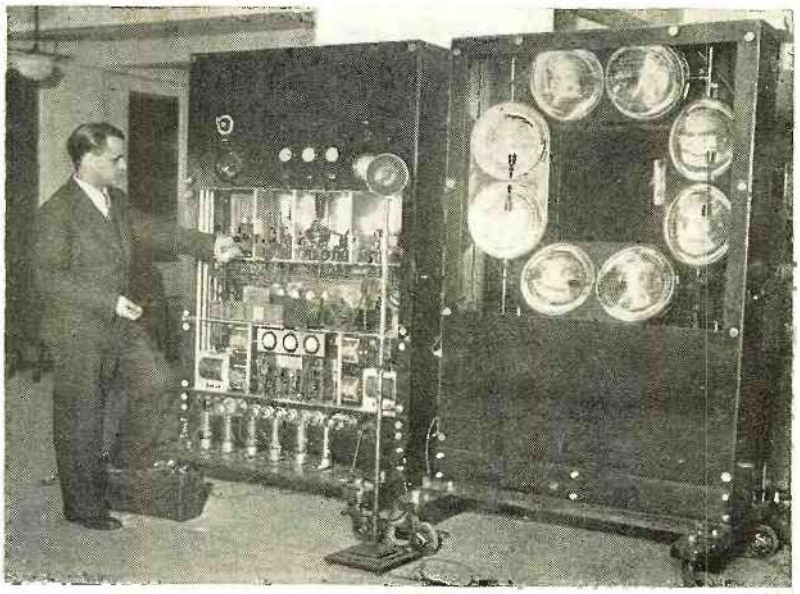
THE prediction has often been made that the public will get its first sight of television in the theatre. This is one prediction in a terribly over-predicted field that has finally been fulfilled. On October 24, 1931, the Sanabria apparatus went on the stage of the B. S. Moss Broadway Theatre, New York, and took its place on a typical Broadway variety bill of girls, comedians, dancers and movies. Television was easily the feature attraction and packed the house from noon to midnight.

The television act as it was presented in New York has been booked for a regular vaudeville tour. According to a representative of the booking agency, several identical units will be built and sent out on the "road." If the act reaches your city, by all means go and see it, not for its entertainment value, which is negligible, but for its technical features. The equipment used in the stage demonstrations is worth examination from the mechanical standpoint alone, for it certainly is the largest and most ambitious disc machinery produced so far. Regardless of whether the disc idea survives or not, the Sanabria system represents one important school of television thought, and is exceedingly interesting from a number of angles.

"Ballyhoo" Announcing

The theatrical people, having discovered an ace drawing card in this television stuff, are ballyhooing it extravagantly. Unfortunately, they are leaving many things unsaid, and they are only compounding the 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 hired blurb-spouter points to a ten-foot screen and a ton 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 unpleas-



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 rate the Sanabria images, projected on a large screen with a 45-aperture 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 again 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 surface of 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.

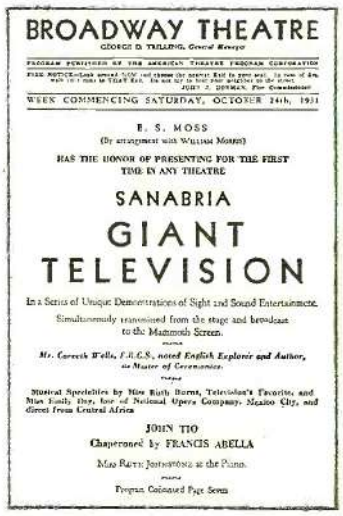
The first hole of spiral 3 then scans the remaining space left blank between the first and second holes of spiral 1. Progressively down the subject the holes of spiral 3 scan the last third of the surface, until the fifteenth hole sweeps across the very bottom limit.

At the receiving or reproducing end the process is the same, the scanning disc recreating the image in the same manner that it was broken down.

Since all three scannings 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.

THE TELEVISION STUDIO

An artist's conception of the television transmitter in operation. This equipment was located in a glass enclosed studio, in full view of the audience. The transmitter output was carried to the projector equipment over wires



BROADWAY THEATRE

GEORGE D. TRILLING, *General Manager*

PROGRAM PERMITTED BY THE AMERICAN THEATRE PRODUCING CORPORATION

FREE NOTICE—Look around NOW and choose the nearest Exit to your seat. In case of fire, walk (DO NOT RUN) to THAT Exit. Do not turn to look—proceed to the street.

JOHN J. DOWLING, *Fire Commissioner*

WEEK COMMENCING SATURDAY, OCTOBER 24th, 1931

B. S. MOSS

(By arrangement with WILLIAM MORRIS)

HAS THE HONOR OF PRESENTING FOR THE FIRST TIME IN ANY THEATRE

SANABRIA

GIANT TELEVISION

In a Series of Unique Demonstrations of Sight and Sound Entertainment.

Simultaneously transmitted from the stage and broadcast to the Mammoth Screen.

Mr. Carruth Wells, F.R.G.S., noted English Explorer and Author, as Master of Ceremonies.

Musical Specialties by Miss Ruth Horne, Television's Favorite, and Miss Emily Day, star of National Opera Company, Mexico City, and direct From Central Africa

JOHN TIO

Chaperoned by FRANCIS ABELLA

Miss Ruth Jorgenson at the Piano.

Program Continued Page Seven

HOW TELEVISION WAS FEATURED IN THE THEATRE PROGRAM

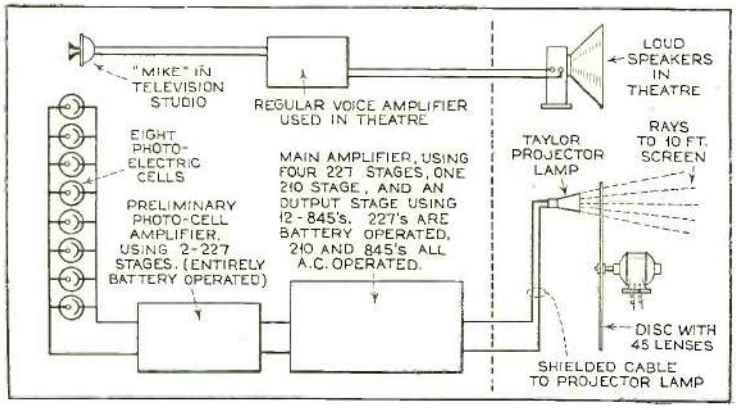


DIAGRAM OF THE THEATRE EQUIPMENT

Figure 2. The transmitter equipment for both image and sound are shown to the left of the broken line. To the right are the loudspeaker and the television projector equipment

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 foci 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*)

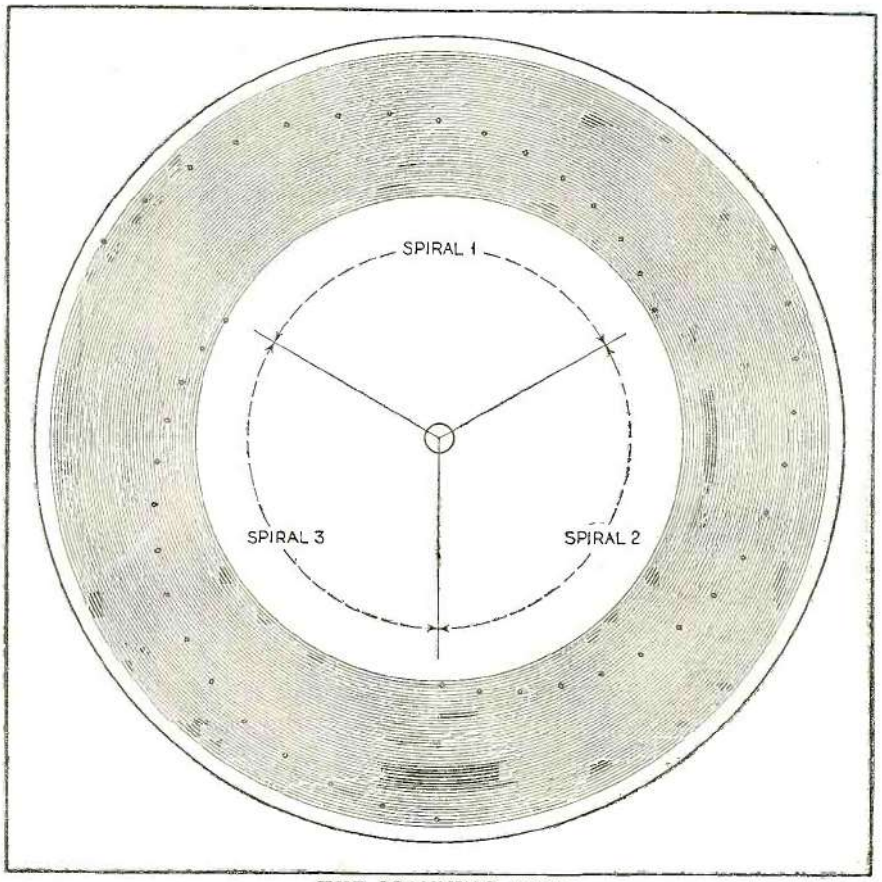
Television Hits Broadway

(*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.

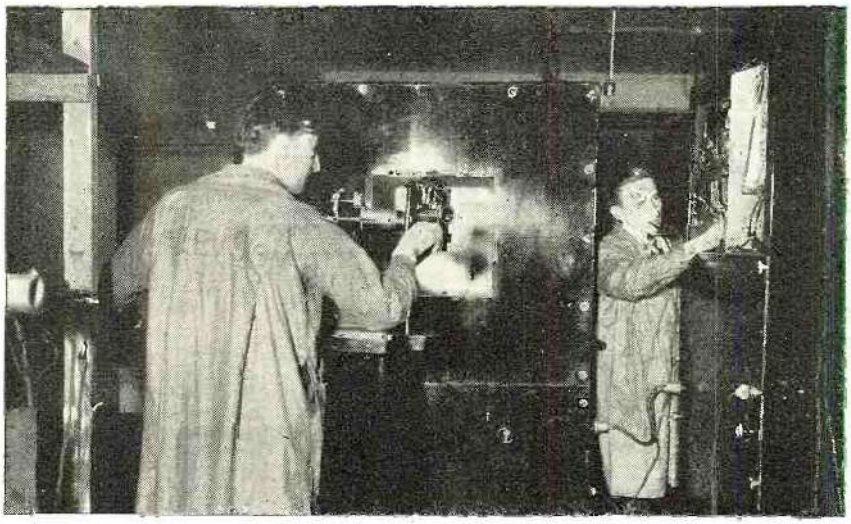
sisting of twelve 75-watt tubes in parallel. The whole amplifier is built up on a portable frame just like the photo-cell unit.

In the stage demonstrations the output of the audio amplifier is led by a short



THE SCANNING DISC

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



THE SCANNING MIRROR

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 consisting of twelve 75-watt tubes in parallel. The whole amplifier is built up on a portable frame just like the photo-cell unit.

In the stage demonstrations the output of the audio amplifier is led by a short wire line directly to the projector apparatus, which is backstage about twenty-five feet away. Under these circumstances

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 energizing current of one ampere at 100 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 men 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 Ulysses A. Sanabria, a quiet and modest young man of only 26. 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 it 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-cells 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 vogue 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 540 the value of the terminal resistance was shown as 100 ohms. The correct value is 1,000 ohms.