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Television for the Home

Behind a Little Three-Inch-Square Aperture, the Moving Picture from the Radio Studio Appears, While the Watcher, with a Push Button in His Hand, Keeps the Picture Synchronized

GROUPS of people sitting in various homes at Schenectady, N. Y., a few weeks ago, saw the performers in a distant broadcasting studio flit across a tiny screen, and from the loud speaker of a radio set heard them talk.

Television, a laboratory plaything that has interested scientists for several years, had arrived.

A large, square cabinet, built somewhat like the bigger talking-machine models, is the first home receiver for radio-transmitted images. The dials of a receiver protrude from its middle, and above them, at the eye level of the seated spectator, appears a three-inch-square window, behind which is the screen on which the images are formed.

The one great problem that has perplexed television experimenters for years —how to synchronize the transmitter and the receiver—was solved by simply ignoring it. Instead of all the elaborate, and very expensive, equipment necessary to keep the whirling disk of pinholes that paints the image on the receiver screen in absolute step with the corresponding mechanism that transmits the original

The Motor-Driven Pinhole Disk, the Neon Lamp That Reproduces the Image and the Picture Receiver

image, the television receiver for home use has a simple rheostat control on the end of an extension cord that permits the spectator to do the synchronizing himself. If the receiving motor runs a trifle fast or a bit too slow, the picture will begin to get out of focus—to slip off the screen. The effect is much like that at the movie theater, when the "frames" of the moving film and the shutter do not work in unison and you see the bottom half of one frame and the top half of another on the screen. The operator makes a simple adjustment to the projector, and the picture is restored to position; and in the same way a slowing down or speeding up of the television-receiver motor brings the picture back into place.

"It is as simple," explains Dr. E. F. W. Alexanderson, of the General Electric laboratories, who developed the machine, "as learning to drive an automobile."

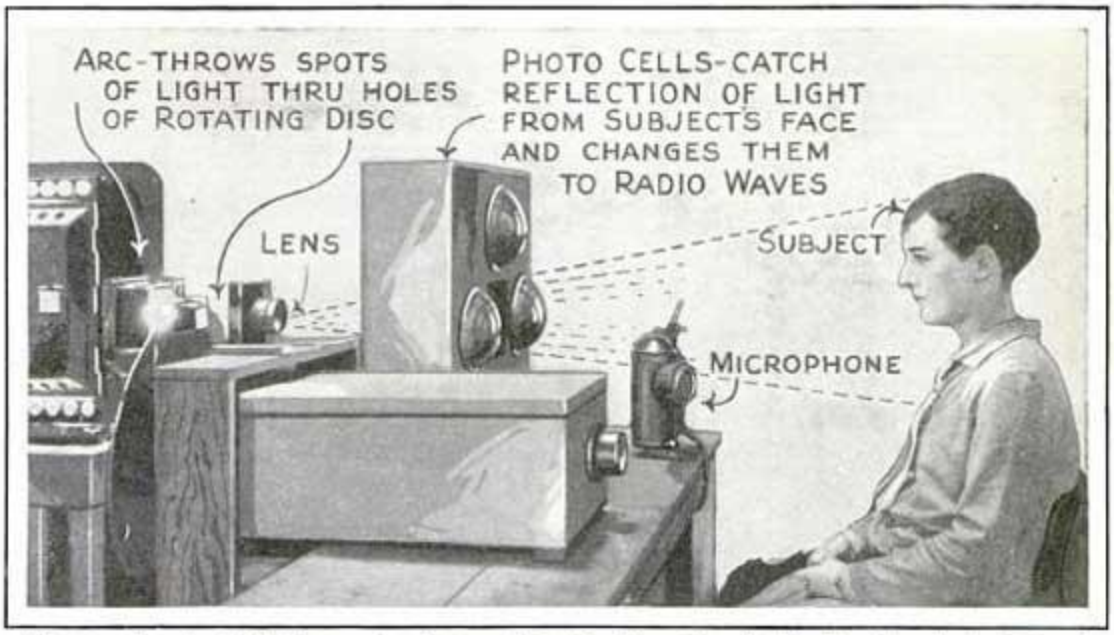
David Saranoff, vice president and general manager of the Radio Corporation of America, predicts that within five years television will be an art and an industry in this country.

Here is how the first practical demonstration in the home worked:

In the studio the performer stands before an ordinary arc light. Between him and the light is a large disk, revolving eighteen times a second, and in the disk are forty-eight holes, arranged in a spiral, so that, in each revolution, successive beams of light are swept across each part of the performer's face. A photo-electric cell is directed toward the performer, and as each light beam is reflected back from his face, it affects the cell, which converts the light into electrical energy.

From there on, the transmission system differs in no important respect from the usual broadcasting outfit. The tiny current wave from the photo cell is magnified and amplified into a powerful signal, which is then dispatched into the air through the antenna on a wavelength of 37.8 meters. The antenna is a new type, the wires arranged in a checkerboard square, each wire being half a wavelength long and so coupled that they are always in phase, eliminating the necessity of antenna tuning. The WGY transmitter, on its usual wavelength of 379.5 meters, was used for the accompanying voice transmission.

In the home there are two receivers,



The Transmitter for Radio Pictures Is a Battery of Sensitive Photo-Electric Cells That Transfer the Reflected Light into Electric Current to Be Broadcast through the Air

one to pick up the voice, on one wavelength, and deliver it, amplified in volume, to the loud speaker. The other, operating on a different wavelength, receives and amplifies the electrical signals produced by the image. Instead of being connected to a loud speaker, the output of this receiver goes to a small "cold light," a neon-gas-filled bulb, which is so sensitive that it can be turned on and off a million times a second, if necessary, with no lingering afterglow, and which has the peculiar property of producing its glow on one side of a targetlike electrode only.

In front of the neon globe, a duplicate of the pinhole disk at the broadcasting station is revolving eighteen times a second, kept in step by the control in the spectator's hands. As its forty-eight apertures sweep in turn across in front of the light, they pass the pulsating light beams, now rising in brilliancy for a high light, and then fading off for a shadow. The disk is twenty-four inches in diameter, and the forty-eight holes each thirty-five millimeters across. The distance between the outer and inner holes of the spiral is calculated to make an image only an inch and a half square, but between the disk and the spectator's window is a magnifying lens that doubles the picture each way, bringing it up to three inches square.

The rate of revolution of the disk—eighteen times per second—produces a corresponding number of images, or two more per second than are seen when movie film is operated at standard speed.

The Moore neon lamp, invented by D. McFarland Moore, an engineer of the Edison lamp works of the General Electric company, gives the picture a distinct pink cast, one of the characteristics of neon which is seen in the new type of signs now in use.

In the demonstration at Schenectady, performers in the studio talked, moved about, lit and smoked cigarets, exhibited their bobs and permanent waves, and performed other stunts. As all the apparatus as yet built has such small receiving screens, no attempt has been made to transmit an entire studio scene, an orchestra playing, or even a full-length portrait of a moving person.

One of the interesting things about the television demonstration is that, when the broadcasting of images becomes a regular feature, anyone will be able to build receivers, for none of the principal features will be covered by basic patents. The revolving disk, the neon lamp and the photo-electric cell are all old inventions. There are patents, of course, on the improved features of late models, but the basic ideas involved all date back before the days when radio pictures were thought of.