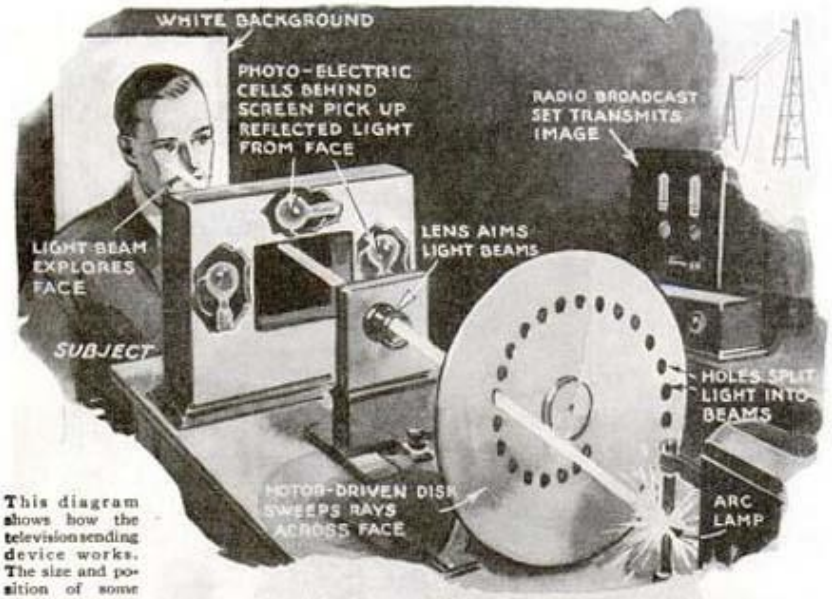
Television Brought Into the



This diagram shows how the television sending device works. The size and position of some of the parts are altered for the sake of clearness

THE BROADCASTING STATION

NOW you are to have a see-by-radio outfit of your own—a device that will enable you to view the prima donna and the musician in a distant broadcasting station just as plainly as your radio receiver permits you to hear them. Engineers are putting the finishing touches on a home television cabinet that they are preparing to make and market by the thousand!

Television, or "radio sight"—only a few months ago a laboratory marvel—has emerged a vital, real fact for the layman. The first few home television sets are already built. In their three-inch windows, the first four private owners, in four Schenectady, N. Y., homes, are looking at faces miles away by radio. Giant high-power radio television stations at Schenectady and San Francisco will soon replace the little experimental station of the General Electric Company at Schenectady that is now broadcasting the first regular television program in radio history. They will hurl faces and moving pictures clear across the continent!

A FEW weeks ago, radio experts gathered in the laboratory of Dr. E. F. W. Alexanderson, inventor of the new home television set, to see its first demonstration. They stood before a mahogany cabinet, its front ornamented with radio dials and an intriguing window three inches square into which they gazed expectantly.

"All ready?" came a voice from a loudspeaker near by. A whirring sound came from the cabinet. Light flickered across the window. In it appeared a face—the moving, living face of a man in the broadcasting room adjoining. "That's Wilkins!" someone exclaimed, even before they heard the voice of Dr. Alexanderson's young assistant on the near-by loudspeaker. It *was* Wilkins—talking, grimacing, smoking a cigarette as plainly as if you were looking at him instead of seeing his image broadcast by radio!

Only with elaborate and costly apparatus had such a feat ever been achieved before. Last year the Bell Telephone Laboratories heralded successful television with a maze of apparatus that successfully made visible to New York City spectators the face of Secretary Hoover in Washington, D. C. Dr. Alexanderson, meanwhile, was working on an elaborate projector to flash distant events as they occurred on huge theater screens. That idea has been shelved, for the moment.

"OUR first goal, and our hardest problem, has been to make a cheap television receiver," Dr. Alexanderson told me. And engineers who saw it estimated that his latest invention could be sold, in its present form, for four or five hundred dollars. You might make one yourself, they said, and still have change from a hundred-dollar bill!

Imagine yourself seated before such a cabinet. Your loudspeaker is already bringing music to your ears; now you want to see the singer. You twirl the television dials; fine black dots appear on the window. You tune more carefully; the dots become coarse ones . . . black streaks . . . wide splotches . . . and a face appears! It is the singer, clear and distinct. You settle back in your easy chair for the weird experience of seeing and hearing by radio.

In Dr. Alexanderson's private home at Schenectady I watched the miracle. I could see R. D. Kell, his chief assistant, playing the harmonica several miles away in the broadcasting room. Occasionally the image, tinged with a pinkish glow characteristic of the device, floated off the window, then quickly returned. By pressing on a push button, Dr. Alexanderson could keep the picture within the window.

Dr. Alexanderson watches the window as R. D. Kell "tunes in," synchronizing the received image with transmitted scene by means of push button in his right hand

Television transmitter, showing arc light holder, perforated disk and lens casting rays on subject

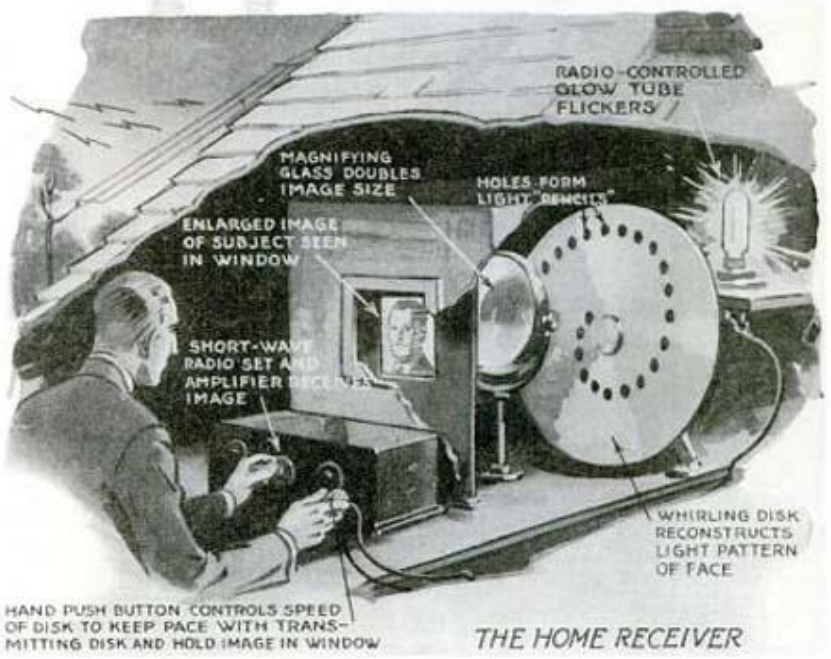
Of course, the "picture radio" is not perfect. No one claims it is. It is a

Home—*The Newest Radio Marvel*

By
ALDEN P. ARMAGNAC

practical set for you and me, not a million-dollar laboratory curiosity. Black lines faintly streak the image, though faces are clearly recognizable. You cannot see colors by radio. "That will come later," Dr. Alexanderson said. Outdoor scenes of large area—football games and parades, for instance—cannot yet be transmitted; only persons in the broadcasting studio, sitting in artificial light, or moving picture films. But this is the first practical step—far more than halfway—toward seeing and hearing distant events perfectly without leaving your chair.

How is it all done?



How television receiver works. Size and location of some parts exaggerated for sake of clearness

ESSENTIALLY, the transmitter chops a man's face into pieces like those of a picture puzzle, and radios them to the receiver where they are put together again. Eighteen such picture puzzles a second follow one another in succession. Flashed on the receiving screen at a speed a little faster than motion pictures, they have the same effect of continuity.

At the broadcasting station, a beam of light skims over the face of the subject sitting in semidarkness. Another follows, bordering the path of the first just as you skirt with your lawn mower a path you have just traversed. Forty-six more in quick succession scan the man's features completely; they are aimed by a whirling disk pierced with a spiral of holes, each thirty-five thousandths of an inch in diameter. "Some other systems use lenses, or mirrors," Dr. Alexanderson said, "but a hole is cheaper than a lens, and forty-eight holes are cheaper than forty-eight lenses." Mirror disks, he said, may eventually transmit outdoor scenes.

Sensitive electric cells in front of the subject translate into electric impulses the lightness or darkness that the exploring beam reveals. "White," they radio when it strikes the man's cheek. "Black," they signal when it strikes his mustache. "Grey"—a weak impulse—as it passes over a shadow.

In your home cabinet a pinkish electric bulb, a "neon glow tube" that can light or extinguish itself in a millionth of a second, is glowing momentarily when the signal comes "white" and going out for "black." In front of it a whirling, pierced disk just like the one at the broadcasting station, and spinning at exactly the same speed, is aiming the light flashes at the right places in the window. The picture puzzle is put together again, and what you see is the face of the subject, miles away!

One startling improvement Dr. Alexanderson has made defies the long-accepted belief that some automatic, complicated synchronizing device must be provided to keep the transmitter and the receiver working at exactly the same speed—so that the picture will stay in the receiver's window instead of slipping across it. Instead, through a push button held in your hand, you can regulate the motor that drives the whirling disk in your receiver. When your disk is running at the same speed as the disk in the broadcasting studio, the picture is steady!

SO, WITH a motor that is the duplicate of the one in your vacuum cleaner or sewing machine; a metal disk that any machinist will make for, say, fifteen dollars; a "neon glow tube" that will be inexpensive soon, when it is made in quantity, and a short-wave radio receiver that is easily built—with these you can, some day before long, construct your own television receiving set. Or, if you prefer, you will be able to buy one—for television is going into quantity production!

This is the climax of years that Dr. Alexanderson has spent on the problems of radio vision. "We knew how to go about it," he told me, "but we had to be optimists and wait for new ideas, new devices that would make it practical. D. McFarlan Moore, of the Edison Lamp Works, made such a discovery in the neon tube we are using. To avoid eye-strain of the person being broadcast, we adapted to our use the ingenious system of photo-electric cells that the Bell Telephone

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RADIO STEREOPTICON, TOO

Another of Dr. Alexanderson's inventions, recently demonstrated from the New York broadcasting station WEAF, is a transmitter and a home picture receiver, the latter attachable to the ordinary radio set. By means of this a radio owner may receive "still" photographs of performers, printed radio programs, musical scores and the like, which are broadcast from any station having the transmitting equipment. Similar to commercial outfits, but greatly simplified, it is devised to serve radio listeners as a stereopticon serves the audience in a lecture hall.

It requires ninety seconds to transmit a single picture. The original picture is scanned by a light beam and the various lights and shades transmitted to the receiver, where they are impressed through a Moore glow tube on photographic paper. When this is rinsed in chemicals the picture appears.

Dr. Alexanderson, who with D. McFarlan Moore, inventor of the glow tube, perfected this device, is shown above working on an experimental model of the picture receiver.

Television Brought into the Home

(*Continued from page 21*)

Laboratories worked out. With successful short-wave radio, necessary to transmit the inconceivably high-speed impulses that television demands, practical television was within our grasp."

As long ago as last December, the first of the television sets was ready and experimental broadcasting commenced—voices on the regular wave length of station WGY, Schenectady, and radio images down on the low wave of 37.8 meters. Within a few weeks long-distance broadcasters at Schenectady and San Francisco, with "checkerboard" aerials and a twenty-two-meter wave—found most efficient for long-range television—will test the performance of dozens of receivers scattered throughout the country. Television itself has proved an exceptionally good instrument to test radio transmission. Dr. Alexanderson says blurred or "ghost" television images are explaining many of the mysteries of static, fading and the "radio roof."

When will the sets be ready to be marketed? "Reasonably soon," is all David Sarnoff, of the Radio Corporation of America, who saw the demonstration, will say. But he adds: "Within five years television will be an art and an industry."

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