

MEET the



Directional antenna for a television receiver installed in an automobile. Amateurs contribute much with experimental work

TELEVISION is in about the same stage of development as radio was in the 1920's when receivers were expensive and many thousands of mechanically minded men and boys built their own sets. You can buy a television set today ranging in price from \$100 to \$800, but those prices are beyond the average man's pocketbook.

So right now in basements, garages and attic workshops in America's major television areas, mechanically minded men and boys are building their own sight-and-sound sets. Most of the television "hams"—amateurs—have had some sort of experience with radio, for constructing a television receiver is far more complicated than was putting together a crystal set.

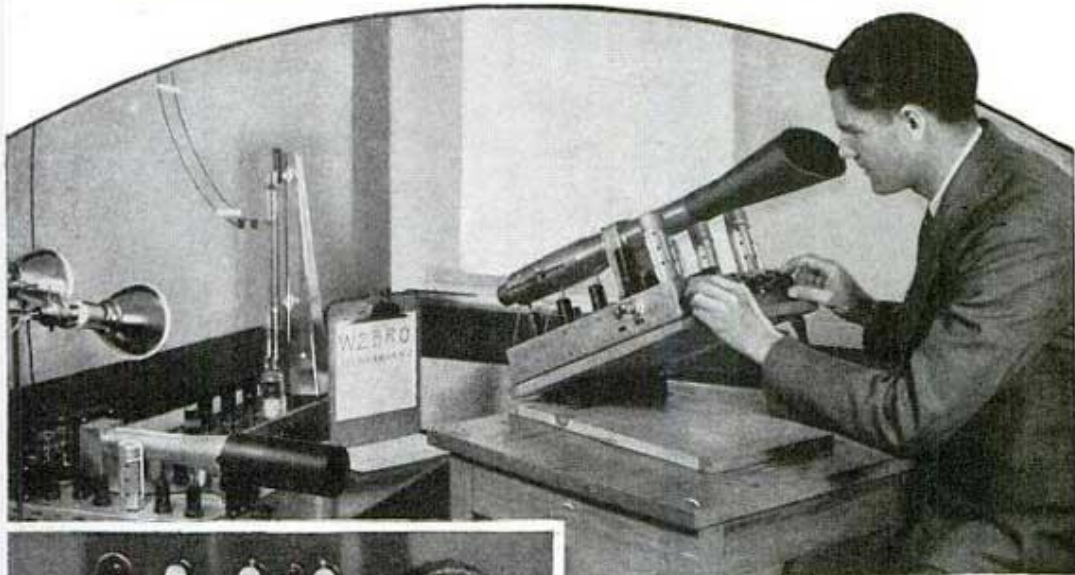
Los Angeles and New York are the two main television centers of America today and it is in these areas that most of the television hams are to be found. W6XAO, the Don Lee television station in Los Angeles, has been telecasting for nine years, and W2XBS, the RCA station, and W2XAX, the Columbia station in New York, are actively cooperating with amateurs. Recently it was announced that \$8,000,000 would be spent in New York and Los Angeles, as well as several other American cities, in a program of research and experimentation.

How many television amateurs there are

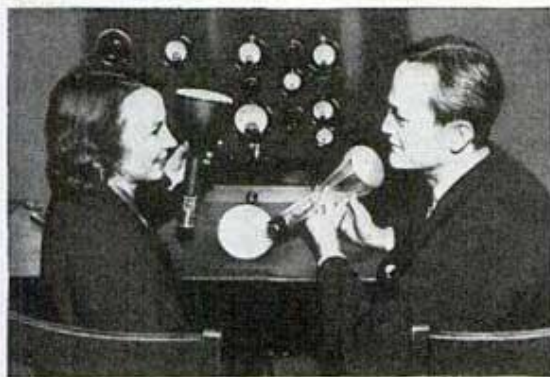


Device used in the field to measure the wave that carries the television image

TELEVISION "HAMS"



New tube which allows television amateurs to broadcast as well as receive images



Heart of the television receiver is the cathode-ray tube which creates the picture

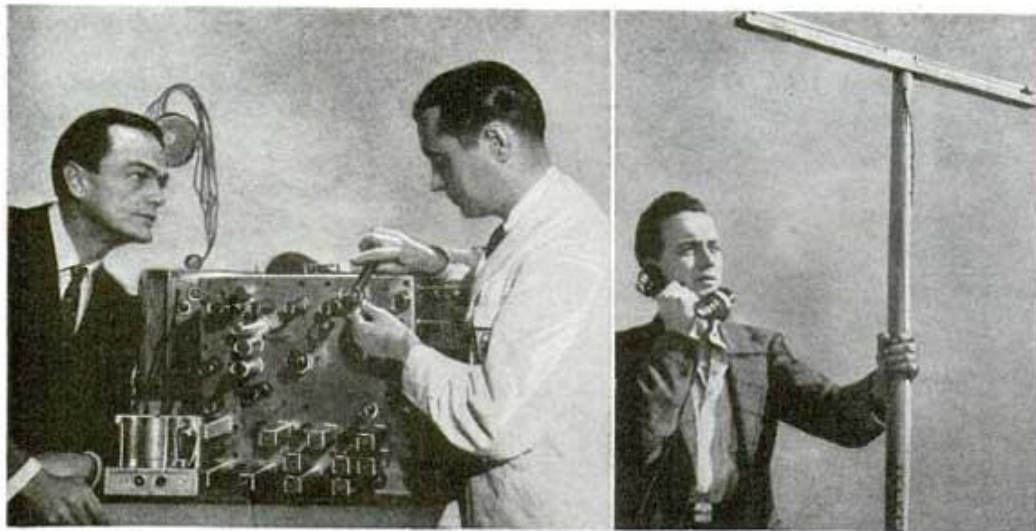


Miniature telecasting station (top cabinet) tests reception of receiving set below

in the United States is a question hard to answer. The Los Angeles and New York areas each boast around 200. In other cities such as Boston, Philadelphia, Camden, Kansas City, Chicago and San Francisco there are smaller groups.

In the beginning the television hams annoyed the professional engineers. They snooped around to watch television demonstrations, they asked foolish questions, and only clamored for help when their homemade sets wouldn't operate. Finding they could not get rid of the hams, the engineers began to cooperate with them. They furnished diagrams and advice on how to build sets; they appeared at meetings of the amateurs and explained telecasting. The results were amazing. Engineers found that the amateurs could be extremely helpful. The hams checked on the programs and sent in reports and comments. This cooperation has been an important factor in making Los Angeles and New York the leading television centers.

Television amateurs have also contributed important information on television reception. In Los Angeles, a group of amateurs has plotted the entire city for miles in various directions. They know what sort of reception can be expected and how



Amateurs building set. Right, testing for proper location of antenna



Portable television receiver. Below, testing television wave strength



powerful a set is needed to pick up W6XAO. They have also learned how to eliminate interference from automobile ignition systems and physicians' short-wave diathermy machines. Many experiments have been made with different antennas.

Sometimes "ghosts," double images, appear on the television screen. They are thought to be caused by high-frequency waves which bounce off the sides of large buildings and produce not one but two images in the receiver. The amateurs have learned how to eliminate these "ghosts."

Not long ago a television amateur, greatly excited, phoned engineers at Los Angeles' W6XAO: "Say, what's the matter with you fellows? You're sending out your program upside down!"

A couple of engineers jumped into their car and drove to the ham's workshop. Maybe this was some new trick of the high-frequency television beams. They discovered, however, that the amateur had merely put in his cathode-ray tube upside down. When it was righted, everything was O.K.

Candid camera fans have turned to television as an interesting source of picture material. They train their lenses upon the television receiver screen and snap photographs of the actors. Not long ago a University of Southern California anthropology professor was pictured—holding a gleaming white skull against a black background.

Telephone calls poured into W6XAO:

"Keep the professor before the television camera a little longer so we can get a good candid camera picture."

Television hams are continually experimenting with various types of receivers. Several types of portable receivers have been built and Thornton Chew, in Los Angeles, has built an automobile receiver.

Television amateurs have been building

receiving sets for several years. But until recently, telecasting was out of the question because it was too expensive. Now a new inexpensive television camera "eye" tube has been perfected by the RCA laboratories which, for the first time, will open up the field of electronic telecasting as well as receiving. The new tube is actually a small, much simplified version of the more familiar "iconoscope" television-camera tubes used in television studio cameras. It is being placed on the market to sell at slightly less than \$25.

With the new iconoscope, it is practicable for the first time for amateurs to build a complete electronic television transmitting and receiving system at a total cost of approximately \$300 or less, depending on the equipment at hand. This cost compares favorably with the cost of a medium-power amateur radiophone system. In fact, amateurs who now have two and one-half meter transmitters will find it relatively simple to adapt them for sending television signals alternately with sound broadcasts.

The iconoscope is the "eye" of television, changing light into millions of infinitely small electric impulses which are amplified and then flashed through the ether to the receiving antenna. While performing much the same function of the larger commercial iconoscope, the new tube does not resemble it in appearance. Measuring about seven inches in length as compared with the other's 20-inch length, it looks like a tapered drinking glass with the top sealed.

In operation, the new tube is placed behind a small lens which focuses the scene upon the front surface of the mosaic. The light strikes through the transparent surface to the back surface which is scanned by an electron gun shooting a stream of electrons across it in horizontal lines at the rate of 300 miles an hour. Scanning the mosaic a line at a time, the electrons transmit thirty com-

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plete pictures in the form of electrical impulses every second. Each picture is actually millions of tiny dots, each of which is transmitted separately.

The 120-line pictures transmitted by the iconoscope, while not of the same quality as the 441-line television images being broadcast in New York, are remarkably clear and sharp—being equivalent to newspaper half-tone reproduction. The new iconoscope transmits a television picture about one and one-half inches square which may be enlarged at the receiver. The receiver may show a picture having many times the iconoscope picture area.

Two-way television was demonstrated for the first time last summer at the New York World's Fair amateur radio station W2USA. An amateur-type television camera and receiving set, furnished by RCA, flashed pictures with voice between the Communications Building at the Fair and the New York Daily News building eight miles away. Successful reception was reported by other amateurs up to thirty miles. One feature was the two-way conversation carried on by two deaf-mute girls using their sign language over the picture channel.

In its research and development work, RCA collaborated with the American Radio Relay League, which has been seeking for several years to make it possible for the amateur radio enthusiasts to enter the television field. All the necessary equipment has been available for some time for amateurs, with the exception of the iconoscope.

The opening of the electronic television field to amateurs will serve to widen existing popular interest in the new art, and at the same time accelerate progress in television development. The radio industry today points to a number of important steps pioneered by American amateurs, including the development of new circuits. Radio amateurs were among the first to demonstrate the enormous possibilities of short waves—a region which at the time was not highly regarded for radio purposes.

☛ See index, page 4-A, to find where to buy articles described in this magazine. Say you saw it in Popular Mechanics.

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