TELEVISION as GOOD as HOME MOVIES

Being a report of a television demonstration staged in Philadelphia in which sight and sound programs were received in a home with a scale of picture detail, accompanied by high-fidelity sound reproduction, good enough to be accepted immediately on the basis of commercial broadcasting. Fundamental technical data on the system is also presented for the benefit of amateurs and experimenters thinking about building.

By The Television Reporter

WHAT was undoubtedly one of the finest demonstrations of television transmission by radio was viewed by your reporter, recently, when Philco Radio and Television Corporation transmitted sight and sound programs from their main laboratory in Philadelphia to the home of W. H. Grinditch, seven and one-half miles distant from the transmitter.

One thing that impressed us in the demonstration was the total absence of flicker and the smooth definition of the received pictures, which reminded us exactly of our own home moving-picture outfit in clarity of detail. This definition was great enough to allow the picture and writing on a package of Camel cigarettes to be read at the receiver when placed in front of the television (advertisers make note).

Defects Absent

This was the first time that we have viewed a demonstration of television in which the small but nevertheless bothersome inequalities of detail, small specks, wobble, did not interfere with the continuity of the picture being transmitted. In fact, they were absent and the feeling of actual vision, of the thing you are looking at, was experienced for the first time.

The picture on this page was taken with an ordinary camera focused on the screen, by one of the editors as the program went on. It really suffers by being a photograph of a photograph and also in being made into a cut for reproduction on this page, but at least it does give an idea of the smooth and natural pictures that were seen.

What Was Seen

During the demonstration artists selected from the Philco staff, including singers, dancers and a whole quartet were viewed and heard. The inimitable Boake Carter was interviewed from Mr. Grinditch's home by telephone to the television studio. Mr. Carter was seated at a small table with the telephone in front of him and his answers to questions and comments about television were very much to the point. It was interesting to note the changes in expression on
his face coming to us by television as he made a point or as he stressed an idea, with words which came to us from the loudspeaker. If all the broadcast listeners who hear his news comments daily could only have seen his face as we did, they would have had even a better insight into the quick perception of that very active brain.

What a Fight!

Another scene, that had us "lookers-in" up on the edges of our seats, was a one-round contest in which the boxers (drawn from the factory force) put up a lively "scrap" in a ring built outdoors on the roof. This scrap was climaxed by one of the contestants knocking the other clear out of the make-shift ring. Actually he took the whole ring with him, railing, posts and everything; all the details of this were easily shown and were quite unexpected and humorous. Even the announcer could hardly stop laughing at the incident.

One of the most significant features of the whole demonstration was the running of a one-reel moving picture showing the exploits of a wild-life collector catching various animals by a novel, but it seemed to us quite hazardous, method; catching them with his hands. He dived from the banks of a jungle stream into the water after alligators, fish, huge turtles, otter, and actually out-swam his victims. Some of these views were "under-water" shots and we were sorry to see the end of the picture arrive. When television comes (and it is on the way) moving pictures such as this can be viewed right in our own homes, and the moving picture industry had better watch its laurels! It seems to us that moving pictures and television will have to be very closely tied up in the future and it would be only logical to expect that the moving picture industry will associate themselves with, or control, the interests who will do our future television broadcasting.

But now for some of the details of the Philco television system. Some of this information will be important to those amateurs or experimenters who are thinking of building experimental types of television receivers and are trying to learn the fundamentals on which future broadcasts will be based. The electrical specifications for this system are as follows. The carrier frequency of the picture transmitter is 51 megacycles. The carrier frequency for the sound transmission was 54.25 mc. This makes a spacing, between the two carrier centers, of 3.25 mc. approximately. The total space taken up in the ultra-short-wave spectrum is 8 mc.

The number of scanning lines was 345, but this is being changed to conform to the R.M.A. recommendations of 440—450 lines. The number of pictures-per-second transmitted were 60. 30 of them being interlaced. By "interlacing" is meant that the lines of each consecutive frame show in between the lines of the preceding one. This reduces the rather striped appearance of earlier methods. The polarity of the transmission is negative. The aspect ratio is 4:3. The percentage of television signal devoted to the synchronizing signal was 32 percent. The wave-form of the

NEW JOBS FOR TECHNICIANS

There will be many calls for operators of television transmitters, men who understand both radio and television when this art becomes established on a commercial basis.

A SUBJECT BEING "SCANNED"

This young lady, who sang for the audience, is shown before the television camera with an operator focusing the device just as the test television program started.
Television Like Home Movies

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synchronizing signal is narrow and vertical. The focusing device for picking up the television signal looks somewhat like a camera on wheels. It contains a large tube, operating on electrostatic and cathode-ray principles combined. This tube generates the scanned signal method, voltages corresponding to the light and shade of the television picture which is focused to the surface of the signal plate of the tube. A panel amplifier in the control room strengthens these varying voltages about 10,000 times, to modulate the signals on the beam of the picture. Also mixed with this television signal, as it is transmitted, are the synchronizing and blanking impulses. These impulses when received by the receiving set control the movement of the electronic beam in the receiving cathode-ray tube which reproduces the picture.

In the studio there were, of course, accompanying the picture transmitting apparatus, microphones and high-frequency amplifiers and a wireless transmitter for sending the sounds to our receiving location.

A separate pick-up device consisting of a specially built project was used for transmitting the motion picture part of the program. This apparatus energizes the same radio transmitter that is used for televising the actual scenes.

The receiver used at Mr. Grindell's home, over which we saw and heard the program, comprised a combination sound and television receiver, an experimental Philco model which tuned over the frequency range of 42.5-50 mc. These receivers receive the sound and sight signals, separately, and the tuning in the dual program was accomplished very much as one would tune the usual sound receiver. They are not at all difficult to operate. Front and rear views of this receiver are shown on these pages. The rear view shows (at top) the metal container for the cathode-ray tube and surrounding this are the units for synchronizing and controlling the beam. The power units are distributed along the bottom of the cabinet.

The total number of tubes used in the set is 36. Looking at the front of this cabinet one can see (at the top) the hinged mirror which reflects the picture to the listener's eyes. There is a switch to lower down on the front of the cabinet (at right and left) the sound and television tuning knobs and dials.

Philco officials stated that they have been working steadily but quietly on television for a number of years, first using 60-line scanning disks in 1928. In 1932 they started transmissions over their experimental station WXXE transmitting 240-line pictures by an electronic method. The next work carried them through the necessary research work in the vacuum tube laboratory, on special tubes to be used in the system, and later, that Farms worth collaborated in this work. The next experiments were made with 345 lines and in due course the necessary wide band amplifiers were developed and improved. Other special new tubes were designed to meet the requirements and once again defects and difficulties were eliminated one by one. The first experiments with 345 lines were made by wire; then later the experimental television transmitter WXXE was built and the power increased to 125 kw.

Next in line came transmitting experiments, over long distances, to the suburbs, to find what power was necessary to flash television signals to distances in a circle at least 7 miles from the transmitter. Various types of antennas and transmission lines were used and a mobile truck, was employed, fully equipped with television apparatus, for testing field strength for satisfactory service throughout the city.

Along with this were used in combination television and sound receivers, to develop the apparatus necessary to receive the programs.

With all these units of a complete system developed and operating satisfactorily, field tests were started on the system in December, 1935. Many changes have been made since then and starting in June, 1936, another series of experimental programs were broadcast nightly by the station on 31 and 33.25 mc. As a result of these tests the present apparatus used by Philco was developed so that this very excellent demonstration could be made. Philco engineers tell us that work is now progressing on still another stage of progress. Mr. Larry E. Outeh, President of the company, when asked how soon we would have television commercially, stated, "Commercial television will not come until 1936," but he added "Television is going to be a tremendous industry when it does come." Mr. James M. Skinner, Chairman of the Board, stated that he believed television sets could be sold as soon as a reliable service started." Sayre M. Ramsdell, Executive Vice President of the company, made it clear that "Philco's main objective in television, at present, was to produce and receive a good picture." He also said that "we have a patent pool like that in the automobile industry, so that everybody could use these patents to build and sell big sets without much competition." He also stressed the point that a single set of television standards must be arrived at and that this standard should be set high enough to give definition as good as home moving pictures.

The "Spiderweb" Snags All Waves

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buy rope which was used in this particular installation to counteract the pull of the transmission line which would otherwise pull the antenna out of shape.

At the receiver end of the transmission line is another matching transformer which automatically selects the proper antenna for the frequency to which the receiver is tuned. This selection is accomplished electrically and therefore does not require any mechanical operation on the part of the listener. The transmission line is simply connected to the two terminals provided for this transformer and the other transformer terminals are connected to the antenna and ground terminals of the receiver.

At first glance this antenna may appear to be a rather complicated arrangement but after all it is only by means of complicated arrangements that effective reception is possible. Actually all of the complications in this case have been taken care of by the manufacturer. The result is that all the fan has to do is to erect the antenna according to instruction which come with it.