LEE ELLMAKER CHATS WITH OFFICIALS

ABOVE: THE PICK-UP. BELOW: RECEIVER

TELEVISION But Kept

Another demonstration provides is ready for the home so far as

By S. Gordon

THE demonstration of its latest television developments by Philco provided, for this author, a peculiar combination of pleasure and disappointment. Pleasure because the television reproduction was really good—but disappointment because of the relatively small improvement over the demonstration of six months ago by the same company.

The latest demonstration took place at the Germantown Cricket Club, located in a suburb of Philadelphia. Here were arranged several consoles similar in appearance to present-day radio-phonograph combinations. These were the combination sight-and-sound receivers, and in front of each were grouped about 40 chairs. Each console had its built-in loudspeaker equipment and the television scenes appeared in a mirror mounted in the partly opened cover of the console, in such a position that the scenes on the horizontal screen of the cathode-ray tube within the console were reflected in the mirror so that anyone in front of the console could view the pictures.

Demonstrates Distinctly Acceptable Quality

The transmitter was located at the Philco factory, about three miles distant, air line, and the sight-and-sound program was transmitted via the air; the sight on a frequency of 54 megacycles and the sound on 49 megacycles (about 6 meters).

The televised program consisted of a variety of subjects, including an orchestra, a vocalist, a parade of mannequins in a fashion show, a news reel and some outdoor scenes on the roof of the factory. In addition, various small objects were shown to demonstrate the degree of detail that could be reproduced.

It can be said without hesitation that television as demonstrated here would be considered highly satisfactory for the home. With the family seated anywhere within 10 feet of the front of the console, the images on the screen would be distinctly visible in black and white. Close-up views of persons and objects were particularly good. When a dollar bill was placed before the camera, for instance, it was possible to read the serial number; and when an ordinary pocket watch was shown it was posible to even see the moving second hand and the marking on the portion of the dial over which it moved.

Television versus Home Movies

It has been the common practice to compare television with home movies, with due allowance for the fact that the television screen is much smaller than a movie screen, of course. So far as close-ups are concerned, it is believed that this television demonstration did equal good home movies. In the case of more distant "shots," however, the home movies have the edge. Larger objects and persons at a distance from the camera can be clearly seen, but, beyond a few feet, facial features become vague. Thus a person who is clearly identified in a close-up can be recognized when 10 or 15 feet distant from the camera only by the clothes or general appearance.

The news-reel reproduction suffered for this reason. The various scenes were clear enough to be interesting. Close-up views of persons, and some close-up shots of the rushing torrents of the Ohio during the showing of flood scenes were really excellent. But a motorboat passing up one of the flooded

PHILCO TELEVISION EQUIPMENT

Top: The receiver, and grouped around it, left to right, James M. Skinner, President, Philco Battery Co.; Lee Ellmaker, Publisher of RADIO NEWS; *Sayre M. Ramsdell and Larry E. Gubb, Vice-President and President, Philco Radio & Television Co. Center: The new Philco Television Camera. At left: Close-up of the latest type of sight-and-sound receiver.*

Now Ready "Under Wraps"

convincing evidence that television technical development is concerned

Taylor

streets, perhaps 50 feet from the camera, was barely distinguishable, requiring several glances to definitely identify it as a boat. It should be pointed out here by way of explanation, however, that the light conditions were evidently poor at the time this scene was made, due to cloudiness and perhaps even a light rain.

A scene, directly televised, showing Connie Mack being interviewed by Boake Carter, left nothing to be desired. With these two well-known gentlemen seated at a table, as shown in one of the photographs on these pages, every feature and facial expression was absolutely distinct.

These observations lead to the conclusion, mentioned before, that television reproduction has developed to a point where it would be accepted with open arms by Mr. and Mrs. Average Man. True, landscapes and other such scenes would be lost and baseball or football games would not lend themselves to "televising" in the present state of the art. But radio artists, speakers, prize-fights and anything else with persons, objects or action within a reasonable distance of the camera would constitute enjoyable and worth-while material for television in the home.

What is Perfection in Television?

The disappointing phase of this demonstration is found in the fact that, although the television interests are withholding television until it is "perfected," the progress made during the past months is very slight. Just what is meant by "perfected" television? Do they mean to hold up its release until they are able to provide television on a large screen such as those used for movies? Do they hope to be able to show clear detail 50 or 100 feet from the camera? If these are the things for which they are waiting it will likely be years before we have television, judging from the minor progress shown in the past year or so.

If it is standardization of scanning they are waiting for, the wait should not be long. All indications are that the 441 lines, 30 frames per second employed in the Philco demonstration have proven highly satisfactory and acceptable. These figures represent the standard proposed by the Radio Manufacturers Association. If this association is agreed, and if those who have witnessed programs using this standard are likewise agreed as to its suitability, why delay further?

And Still We Have to Wait!

One of the important causes for delay to date is found in the failure to decide what frequencies are to be employed for transmission. The Radio Manufacturers Association has recommended the range extending from 42 to 90 megacycles, but it appears that the Federal Communications Commission is loath to grant this request and there are many radio authorities who agree that this is not a logical selection. In this RADIO NEWS heartily concurs.

Entirely aside from the fact that the amateurs were years ago assigned the range extending from 56 to 60 megacycles, and that the R. M. A. would like to see this range taken from the amateurs so as to make their own proposed range continuous from 42 to 90 megacycles, there is another (*Turn to page* 692)

TELEVISING A "SET"

This scene, showing Boake Carter interviewing Connie Mack, was viewed from 3 miles distant, via television, during the Philadelphia demonstration, and was as clear as the printed reproduction shown here.

THE TRANSMITTING ANTENNAS

FASHION SHOWS OF FUTURE

Right: Another one of the scenes shot, as part of a fashion review, during the demonstration. This fashion review indicates a type of program which is bound to be popular when television enters the home—popular with the ladies—the sponsors—and possibly even the men!

MAKE-UP IMPORTANT IN TELEVISION

Models, preparing to participate in the television fashion show, prepare as carefully as they would for the movies or stage.

Television Now Ready

(*Continued from page 653*)

very serious objection to the use of this proposed range for television. This is found in the fact that the range of coverage (in miles) of a station operating below 60 megacycles is extremely variable. A transmitter which on one day finds its range limited to perhaps 25 miles may, due to atmospheric or other natural conditions, find its signals being picked up several thousand miles distant the next day—or even the next hour.

What, then, will happen to the signals from other television stations operating on the same frequency as the transmitter mentioned? Each station will require a band several megacycles wide for its sight-and-sound transmissions and with the total proposed television frequency range there will be only about a dozen channels. The normal expected coverage of a single station will be an area approximately 25 miles in diameter and therefore to provide television programs over even the more populous portions of the U. S. will require hundreds of transmitters. The hodge-podge that will result at such times as these frequencies "open up" can well be imagined.

For a moment let us consider the facts about the varying phenomena encountered on the ultra-high frequencies so far as their mileage range is concerned. The range of 28-30 megacycles is considered the best range in the frequency spectrum for long-distance transmission with low power. Amateurs using "fly-power" of only 10 to 50 watts establish practically daily contacts during the winter with other amateurs thousands of miles away. The broadcast and commercial stations operating between 30 and 40 megacycles are heard, some of them consistently, at distances up to 10,000 miles. The sound transmissions from the N. B. C. Empire State Tower television station, operating on 52 megacycles, are quite commonly heard by experimenters in Europe, and the European television transmitters are frequently heard on experimental receivers in the U. S. All of these facts point to the futility of employing these frequencies for television—and their desirability for other services which can use their distance range to advantage.

The 56-60 megacycle amateur band is likewise unsuited for television, even if the Federal Communications Commission could be induced to dispossess the amateurs. Eight months ago Laurence M. Cockaday started a series of test transmissions on 58 megacycles from his amateur station, W2JCY, at North Pelham, New York, and arranged for a group of amateurs in England to listen for his signals from 1:00 to 1:15 a.m., E.S.T., each Sunday morning. As a result of these tests, *out of a total of 15 transmissions, 5 were reported heard in England and the reports accurately and completely verified.* His 5-meter signals were first heard in Wales one year ago, that being the first verified crossing of the Atlantic on this frequency. This series of tests was inaugurated to provide a further check on the belief held by RADIO NEWS that these frequencies are *not* suited to television.

The British amateur station G5BY more recently inaugurated a similar series of tests on 56 mc., with the result that his signals have been heard by a half dozen New York hams.

In view of this situation, why delay television by continuing to argue for a group of frequencies which, if obtained, would be found largely unsuited to television—only to face further delay in demanding another range that would be better suited to the purpose and in rebuilding transmitters. It would seem far more logical for the R. M. A. to accept the obvious and change their recommendation to include the range between approximately 70 and 120 megacycles. This is a range for which there is little or no demand for other services and it is highly probable that the F. C. C. would speedily grant such a revised request.

This emphasis is being placed on frequency assignment in this article because the television interests have seen fit to emphasize this as one of the main things holding up television development.

RADIO NEWS went on record months ago to the effect that television was being unnecessarily delayed—for reasons best known to these television interests. The interests now announce that television will not be made available to the public during 1937, and perhaps not during 1938. There still remains a great deal of doubt as to why this should be so. Several of the European countries have established television systems, with receivers on the market for anyone who cares to buy. In the earlier days of radio broadcasting the radio busi-

ness in the U. S. developed far more rapidly than that of foreign countries.

With the engineering and production facilities of American plants, the tremendous buying power of the American public and the ability of manufacturers to promote sales, there seems to be little reason why this same condition cannot apply to television. But it is not likely to apply if the present system of laboratory incubation is continued. Open competition is needed as a spur for development and perfection of television. Under the present system the smaller manufacturer cannot afford to participate in the development—nor can he force the hands of the "big shots" by actually producing and selling television equipment—for the simple reason that through their patent holdings a few large companies have an effective strangle hold on the situation. Until they give the word "Go!"—and this evidently is not going to occur until they have the patent situation completely sewed up—the public can sit and wait.

The fact is that Philco and others have repeatedly demonstrated television of an order of perfection which any average citizen would enjoy having in his home.

Following is summarized data covering the Philco equipment employed:

Transmitter

Sound Transmitter—Frequency 54 megacycles. Power .25 kilowatt.

Television Transmitter—Frequency 49 mc.; power 4 kw. (peak).

Modulation System—Philco high-fidelity system responding to an unusually wide band of modulating frequencies, the maximum being about 4.5 mc.

PHILCO CAMERA TUBE

P. J. Konkle, Philco television engineer, about to place this "electric eye" in the television camera.

Call Letters—Both sound and television stations operate under a single set of call letters—W3XE, Philadelphia.

Antenna—Height above street level—210 feet. Television transmitter antenna consists of array composed of two dipoles, each fitted with a reflector. The sound antenna consists of a vertical half-wave. Both antennas are fed by coaxial transmission lines.

The System

Number of Lines—441.

Frame Frequency—30 per second.

Field Frequency—60 per second, interlaced.

Aspect Ratio—4:3.

Polarity of Transmission—Negative.

Synchronizing—Amplitude selection is used in connection with the "narrow vertical" synchronizing pulse.

Receivers

Philco Field Test Receivers—Receivers use independent television and sound sections for flexibility. These tune over the range 42-86 mc.

Total Number of Tubes Employed—26.

Picture Tube—12 inches in diameter, giving white and black pictures approximately 7½ x 10 inches.

(High-fidelity picture reproduction on these receivers results from a design which gives an extremely wide receiver acceptance band, wider than 4.5 mc.)

Modern Oscillograph

(*Continued from page 657*)

do this job by any point-to-point method takes altogether too much time and it is also very difficult to tell when the best fidelity consistent with adequate gain has been obtained. With the oscillograph, the problem is greatly simplified and it becomes practical to take on work of this nature at a price attractive to the set owner.

In all aligning operations, the vertical plates of the oscillograph are connected across a load resistor in the detector circuit. A frequency-modulated oscillator must be employed. But there are many other tests which may be made without this additional equipment.

Auto-radio vibrator testing is another field wherein the cathode-ray oscillograph stands supreme. When the vertical plates are connected across the transformer primary circuit, examination of the wave pattern indicates instantly whether the vibrator is in proper condition and whether the buffer condensers are of the proper value. This is particularly important in the case of synchronous vibrators. There will be a break in the curve which should occur near the horizontal axis if the buffer condensers are of the proper value. If this break occurs elsewhere, the vibrator will have short life even though functionally normal at the time of test. At the present rate of auto-radio sales, the replacement vibrator business soon promises to compare with tube sales as a service revenue-producing item.

In replacing parts, it is frequently impossible to secure exact duplicates of the original type. In the case of power transformers, if the replacement is of inadequate power for the job at hand, a distorted wave form will result from the excessive load. A brief examination with the oscillograph will reveal this condition. Often, too, the first section filter condenser will blow and require replacement. A test with the oscillograph will determine whether the peak voltage developed at this point is within the condenser's rating and perhaps save a "no-charge" replacement job in the near future as well as the customer's good-will.

Experimenters will find among the innumerable other applications of the cathode-ray oscillograph a quick and simple method of determining tube characteristics under actual operating conditions. We may, for instance, select grid and plate voltages and then apply a.c. to the grid. By examining the resulting waveform across a load resistance in the plate circuit we will have a complete picture of the tube's operating characteristic.

For transmitting amateurs, this instrument is indispensable. Proper excitation of Class C stages, correct modulation and other characteristics of transmitting apparatus may be rapidly checked.

Detailed information for making a wide variety of tests is given in bulletins issued by the manufacturer. A handy reference book on the subject is "The Cathode-Ray Tube at Work," by John F. Rider. For more advanced students, "Engineering Mathematics," by Steinmetz, is recommended.