



Television



The Latest Developments in the Field

By Robert Hertzberg

THE television plans of numerous stations have been seriously disrupted by the recent order of the Federal Radio Commission calling for an entire rearrangement of the broadcasting situation in the United States. Practically none of the broadcasters escaped some change in wavelength, power or hours of operation; and, as a result, the managers of those stations still "on the air" are very much "up in the air" regarding their general programs. At the time this article was written, the order had not yet gone into effect, and very few stations knew just what they would be doing after it did go into effect.

This state of temporary uncertainty has naturally had a reaction upon designers and manufacturers of television apparatus. It has made some manufacturers delay their plans for the production of television receivers and accessories for home use; but it has by no means halted the progress of the art.

THE FIRST TELEVISION CONFERENCE

That television is actually emerging from the laboratory stage and developing into a commercial proposition is made evident by the recent action of the Radio Manufacturers Association in forming a Television Standardization Committee; the announced purpose of which is to suggest standards of television equipment and definitions of television terms, in order to relieve some of the confusion now surrounding the art.

The committee, of which Mr. D. E. Replogle is chairman, met for the first time in Chicago on October 9, 1928, during the week of the Chicago radio show, and did some commendable work. The limitation of

its activities was acknowledged by those present, but it was the unanimous opinion that a great deal of immediate good would be done for both the industry and the public if even temporary standards were drawn up and adopted. Mr. C. Francis Jenkins, of Washington, D. C., the noted inventor, described the exactly parallel efforts of motion-picture pioneers during the early days of the "movies," and stated that the motion-picture business had benefited greatly by eventually adopting the suggestions of a committee of cinema experts similar to the television committee of the R. M. A.

ON November 2, 1928, the Federal Radio Commission issued an order restricting the hours of still-picture and television broadcasting, at least until January 1, 1929, when the commission will again take under consideration the value of this service to the advancement of radio.

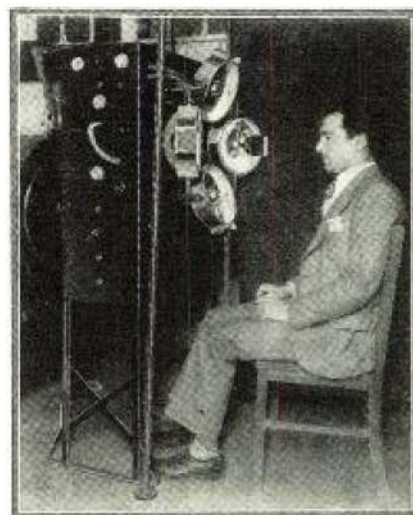
Picture and television broadcasting is permitted on frequencies above 1,500 kilocycles (below 200 meters) only by special authorization of the commission, which will determine the exact frequencies to be used. In addition, such broadcasting will be allowed to a limited extent on the 200-550-meter broadcast band. For the latter range, the commission orders: (1) that the band of frequencies occupied by any such transmission shall be not wider than ten kilocycles; and (2) that such picture and television broadcasting be limited to periods of not more than one hour per day, and forbidden between 6 and 11 p. m.

"STANDARDIZING" TELEVISION

The first problem taken up was the direction of scanning. The fact was brought out that there is no difference in actual efficacy between the top-to-bottom and bottom-to-top methods; although most of the present television systems use the former. It was suggested that the scanning be done just as one reads a book; so, accordingly, the committee agreed on the following:

"SCANNING: It is recommended that scanning at the receiving end be from top to bottom and from left to right, as the observer would see it." This was amended later to read: "SCANNING: It is recommended that scanning at the receiving end be from left to right and from top to bottom in uninterrupted sequence."

The next matter was that of the number of lines per "frame"; the word "frame" first being defined as the scanned area. It appeared that few experimenters are using the



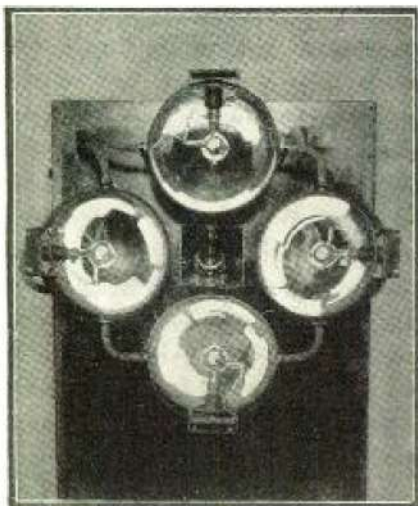
In general construction, the television transmitter using the light reflectors greatly resembles the machine in daily use at WRNY. Above: Mr. E. Manuel showing how the subject poses before the bank of photoelectric cells.

same number of holes in their scanning mechanisms, the actual figures ranging from 24 to 60. It was thought that a 48-hole disc is more flexible than the others, so the committee decided on the following:

"LINES PER FRAME: It is recommended that the number of lines per frame in a television system be 48."

The matter of disc speed, or rather the number of frames per second, was made the subject of considerable discussion. It was agreed that it would be better to adapt existing motors to the needs of television, rather than to force motor manufacturers to produce special machines. Mr. Jenkins stated that ordinary synchronous motors are highly satisfactory for the purpose, and can be adapted readily to television scanning mechanisms with the aid of inexpensive gears. A standard 1,800-r.p.m. synchronous motor, for instance, working through 1:2 reduction gears, will turn a scanning mechanism at 900 r.p.m., producing 15 frames per second. Mr. Jenkins voiced the opinion that, inasmuch as the standard motion-picture projection rate is 16 per second, a rate of 15 frames per second would be entirely acceptable; the slight difference not being at all serious from the standpoint of the moving image. Since the 15 frame-per-second rate is so conveniently obtained with widely available synchronous motors, this number was accepted. The formal statement reads:

"FRAMES PER SECOND: It is recommended that 15 frames per second be adopted as the standard rate."



What you would face if you were being televised. The polished reflectors catch the rays of light reflected from your head, and concentrate them on the photoelectric cells.

Television Broadcasting Schedules

THE stations listed below are known definitely by RADIO NEWS to have television transmitters. Because of the temporary confusion into which the American broadcast stations have been thrown by the new wavelength-allocation order, complete hour-by-hour schedules cannot be printed in this issue. Consult your local newspaper for last-minute changes.

WRNY, Coytesville, N. J.: 297 meters; single-spiral, 48-hole disc, 450 r.p.m.

W2XAL, same location and schedule as WRNY: 30.91 meters.

WCFL, Chicago, Ill.: 309 meters; single-spiral, 48-hole disc, 900 r.p.m.

W3XK, Washington, D. C.: 46.72 meters; Jenkins "radio movies"; can be picked up with single-spiral, 48-hole disc, 900 r.p.m. From 8.00 to 9.00 p. m., E. S. T., on Monday, Wednesday and Friday nights.

W1XAY, Lexington, Mass.: 61.5 meters; television and "radio movies"; single-spiral, 48-hole disc, 900 r.p.m.

WGY, Schenectady, N. Y.: 380 meters; single-spiral, 24-hole disc, 1,200 r.p.m. Also W2XAF, 31.40 meters, and W2XAD, 21.96 meters, associated with WGY.

WIBO, Chicago, Ill.: 526 meters; three-spiral disc, 15 holes per spiral, 900 r.p.m.; Sanabria system.

WMAQ, Chicago, Ill.: 447.5 meters; three-spiral disc, 15 holes per spiral, 900 r.p.m.; Sanabria system.

A number of other stations in various parts of the country are supposed to have television transmitters in operation; but are not listed above because they have not answered, or even acknowledged, telegraphed requests from RADIO NEWS for information about their apparatus.

WHAT IS TELEVISION?

The next matter brought up was that of the definition of television terms. A dozen different definitions of the word "television" itself were offered, but all were too long or unwieldy. They were finally condensed into three words: *vision by radio*; this definition being adopted tentatively by the committee.

Mr. Replegle voiced the opinion that it would be desirable to classify the different existing systems of television transmission, in order to clarify television articles and aid engineers in their considerations of amplifiers and other equipment. After much discussion the following recommended definitions were agreed upon:

"DIRECT FLOOD LIGHTING: A system wherein the object is flooded with light which passes through it into the transmitter pick-up." (This covers certain "radio-movie" transmitters.)

"INDIRECT FLOOD LIGHTING: A system wherein the object is flooded with light which is reflected into the transmitter pick-up." (This takes in some of the Baird machines, and the one described by Theodore H. Nakken on page 20 of RADIO NEWS for July, 1928.)

"DIRECT SPOT LIGHTING: A system wherein a spot of light passes through the object into the transmitter pick-up." (Included in this category is the Jenkins "radio-movie" outfit described in Radio News for August, 1928.)

"INDIRECT SPOT LIGHTING: A system wherein the object is scanned by a spot of light which is reflected into the transmitter pick-up." (This takes in the commonest type of television machine, such as those used by WGY, WRNY, WIBO, WMAQ and others.)

The last matter discussed by the committee was the choice of a suitable name for the source of illumination in a television receiver. *Television lamp* was finally chosen as the simplest and most suitable term.

RADIO NEWS, as the most widely read radio magazine in the world, is glad to adopt for its own use the terms and definitions listed herein, and wishes to congratulate the Television Standardization Committee on its initial efforts.

A NEW DISC SYSTEM

Shortly before this number of RADIO NEWS went to press we received a statement from the Kodak Electric and Manufacturing Company of Cincinnati, Ohio, announcing the development of a "new and entirely different method of television which has been perfected to the point whereby it is now up to the manufacturers of photoelectric cells to build a new cell of sufficient sensitivity to answer the requirements of this new principle of television." The apparatus is still in the experimental stage and no illustrations of it can be published in this number. However, we expect to show some as soon as they are made available. To quote the statement further:

"This new principle overcomes the disadvantages of the scanning disc, in that it is

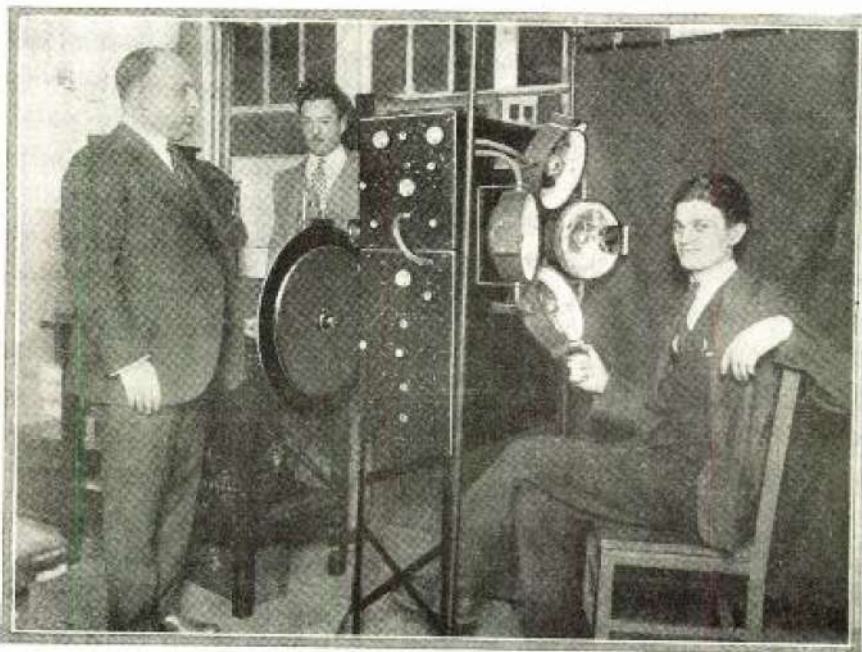
unlimited so far as size is concerned and would permit the broadcasting by television of pictures which could be reproduced on a screen the size of a standard motion-picture screen in any theatre; or on the other extreme, as small as desired in any home; and permits the reproduction of the finest of details, action and proper perspective of any object.

"The new invention uses five or any other uneven number of photoelectric cells, mounted upon the periphery of a heavy cast-aluminum disc. This disc differs from the usual scanning disc previously employed in that it revolves both on its axis and longitudinally therewith; giving the effect, when in motion, of a revolving globe. On the outside edge of this disc, which may be of any size, depending on the dimensions of the television pictures to be transmitted, are mounted super-sensitive photoelectric cells or glow lamps which revolve with it.

"A commutator is arranged to connect only that cell passing through the 'sphere of vision' in the transmitting or receiving circuit. This sphere of vision is a portion of the revolving outer globe-surface, upon which the image to be transmitted is focused by means of a high-speed photographic lens or reproduced by the receptor through variations in light intensity of the glow-lamps as they pass through this sphere of vision.

"The ratio of the revolutions of the revolving disc around its center and the revolutions of the revolving fork or axle carrying the same (which revolves at right angles thereto) is uneven; so that each successive tube as it enters and moves across the sphere of vision does not travel in a straight line, but develops several spirals due to the combination of movements. Since each successive tube enters this sphere of vision slightly out of place from the preceding one, this causes a complete overlapping of the various spirals produced by the cells in their travels; and due to the combined speed of the disc movements and number of cells employed, an enormous number of closely in-

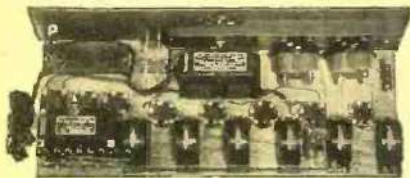
(Continued on page 666)



The new television transmitter constructed by John Gelo (right, seated) is extremely compact, but as efficient as many larger machines. Mr. J. Goldberg, president of the Pilot Electric Mfg Co., is standing in front of the arc light, resting his hand behind the scanning disc. The amplifier is built into the vertical panel.

Until You Have Heard the 1929 A.C. Victoreen

You Have Not Heard
The Best



This marvelous new Super Circuit, developed and perfected in the Victoreen Laboratory, is by long odds the most sensitive and selective ever offered the set builder and radio "fan." It literally bristles with new features, any one of which would be considered sensational in an ordinary circuit.

By all means have a new Victoreen, if you want to enjoy real radio reception. Either build it yourself in a few pleasant hours, or have it built for you. It will bring you distance, selectivity and tone quality such as you have never known before.

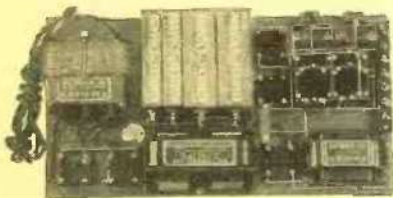
Part of the wonderful improvement is due to changes in the circuit itself, and part to the redesigned R.F. Transformers. These Transformers, tuned and matched to a precision of 1/3 of one per cent, are years ahead of their time. They perform equally well in either the A.C. or D.C. circuits.

Blue Prints FREE

Together with full constructional data. We've made it easy for anyone to assemble a Victoreen. State whether you are interested in the A.C. or D.C. circuit.

To get the utmost in results
from any receiver, use the new

VICTOREEN "B" Power Supply



Here is the last word in "B" Supply and Power Amplifiers. Uses either a UX 250 or 210 in the last stage. Two voltage regulator tubes accurately control the 90 and 180 volt taps, thus making possible accurate determination of proper "C" voltages. There is also a 0 to 90 volt tap, variable; also 450 volts for the power tube.

BLUE PRINT IS FREE, together with list of parts and complete assembly instructions. Write for it today.

The George W. Walker Company
Merchandisers of Victoreen Radio Parts
2825 Chester Ave., Cleveland, Ohio

Victoreen

Quality Radio Parts

Home-Made Dynamic Speakers In Favor Abroad

"HOW can I make a loud speaker of the dynamic type?" This question is being asked with increasing frequency by readers of RADIO NEWS, whose letters plainly indicate that there is considerable interest in the subject.

The answer is that you can't unless you have a complete set of special iron castings for the framework. Once you obtain such castings, the rest of the construction will present no difficulty if you possess a high degree of patience and a fair amount of skill in the handling of ordinary hand tools. You will have to wind an endless lot of fine wire on one of the castings for the field magnet, and you will have to mount the cone and its attached moving coil rather carefully; but there is nothing particularly complicated about these operations. The problem is to get the castings.

In Great Britain several radio manufacturers have found it profitable to put complete sets of castings for dynamic speakers on the market and, according to the British radio magazines, many constructors have successfully assembled very satisfactory reproducers. However, in the United States the effective demand for such castings is not yet heavy enough to encourage manufacturers to go into production on them. If any manufacturer should decide to make them available for the benefit of individual radio fans, RADIO NEWS will be glad to inform its readers thereof. Meanwhile, the only answer to the question from an American fan, "How can I make a dynamic speaker?" is "You can't."

Latest Developments In Television

(Continued from page 631)

terwoven and overlapping spirals are produced each second, producing in the receptor using neon glow-lamps a luminous or glowing field, with sectional variations depending on the intensity of light impressed upon the corresponding photoelectric cells at the transmitter by the reflected object.

"A model developed in the laboratory is approximately 18 inches in diameter, with a sphere of vision 10 inches in diameter. Careful study has revealed the fact that, when the revolving disc turns upon its axis at a speed of 1,000 r.p.m. and the fork hub carrying same revolves at 3,600 r.p.m., the five cells individually and separately will pass through the sphere of vision and make 18 complete spirals per revolution; a total of 18,000 spirals per minute or 300 per second."

This system sounds very interesting, but it also appears to be rather complicated from the mechanical standpoint. As soon as further data on it are released or demonstrations given, RADIO NEWS will report them in full detail.

INCREASING PHOTOELECTRIC-CELL EFFICIENCY

With the newly-created interest in television, as well as in sound-reproducing films and other developments calling for the translation of light intensities into corresponding electrical intensities, the photoelec-

tric cell has become an object of more than usual interest on the part of designers of vacuum tubes. The huge ten-and twelve-inch cells formerly found necessary for efficient television transmission are giving way to comparatively tiny ones—only two and three inches in diameter, but possessing equal or, in some cases, superior light-sensitivity. The advent of these cells will mean a considerable reduction in the size and expense of television machines, and an advantageous increase in their range and flexibility.

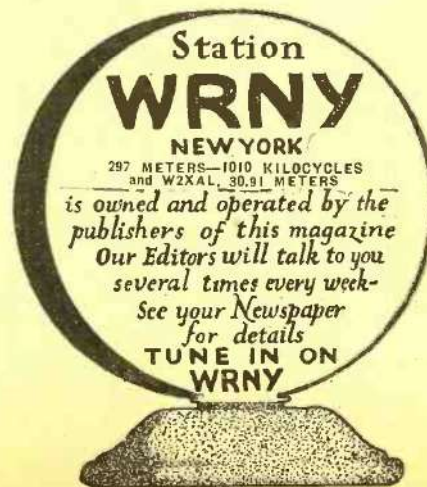
In a new experimental television transmitter constructed by John Geloso, who is responsible for WRNY's successful television, four three-inch cells are used with a system of reflectors which makes them as responsive as the big twelve-inch cells now in regular use at WRNY. The reflectors are of polished metal, about eight inches in diameter, and look exactly like automobile headlights without the front lenses. A cell is mounted at the focus of each reflector, with its sensitive side ("window") facing the surface of the latter, and with its opaque side facing the person being televised.

As the television is of the "indirect-spot-lighting" type (see definition in a previous paragraph) the light reflected back from the subject hits the polished surface of the reflector, which in turn throws it into the photoelectric cell. As the light-gathering surface of the reflector is considerable, the small cell produces an output equal to that of the larger cells. Several views of this transmitter are shown on pages 630 and 631. The apparatus was exhibited at the Electrical Show held in New York last October, and proved to be one of the main attractions of the show.

FOREIGN TELEVISION ACTIVITIES

In Great Britain the company exploiting the inventions of John L. Baird, the noted Scotch television expert, has displayed a number of complete television receivers intended for the commercial market; but just what any purchaser can do with them, in the absence of actual television broadcasting, is highly problematical. The company has definitely promised a television service but, because of the peculiar status of broadcasting in Great Britain, we do not see how it can proceed with its plans until either the British Broadcasting Corporation or the British Post Office changes its mind.

The British Broadcasting Corporation, universally known as the B. B. C., has a monopoly on broadcasting in England,



Please say you saw it in RADIO NEWS