Pictures on a Flat Panel

Dr. Keith Butler, manager of the engineering laboratories where the "Sylvatron" devices were developed, looks on as one of them is put through its paces during the course of tests in the laboratory.

Sylvania gives a public demonstration of pictures in motion on a flat, electroluminescent screen.

IN A "PROGRESS REPORT" and demonstration attended by hundreds of representatives of the press, other manufacturers, and research laboratories throughout the nation, the Lighting Products Division of *Sylvania Electric Products* exhibited three types of electroluminescent panels on which images of various kinds could be produced and/or stored. On one, a moving picture of good definition was shown, with a motion-picture projector as the source providing the excitation.

Although *Sylvania* representatives made no suggestion concerning the eventual use of their developments in producing picture-on-the-wall TV, there was considerable speculation in this direction by those in attendance on just this prospect. The manufacturer is presently more interested in certain applications in military and industrial electronics that show promise of more immediate realization. Under questioning, the belief was expressed that, although there are no permanent, inherent obstacles to use of panels similar to the ones shown for TV image production, much time and many dollars would be required. At least five years were seen as being necessary before such a prospect could be realized.

It is the belief of the editors of Radio & TV News that we will see TV pictures, developed from current standard signals, satisfactorily reproduced on electroluminescent panels before two years are up—although this does not mean that commercially practical receivers will be available at that time. We also believe that the demonstrated developments will have far-reaching consequences in the field of color TV. Before exploring future possibilities, a consideration of the *Sylvatron* panels in their present form is in order:

Type I is a square of glass (or metal) coated with parallel, horizontal conductive strips. A layer of electroluminescent material is coated over the strips, and over this layer is another pattern of conductive strips. The latter group of strips runs vertically, however, at right angles to the first set. With a.c. applied to any horizontal strip and to any vertical strip, the point where they intersect will glow while all other portions of the panel remain dark. In the form demonstrated, this panel has 16 conductive strips per inch. A panel two inches square therefore has 1024 squares which can be individually lit.

Type II is a display panel that can store light. A piece of conductive glass is coated with electroluminescent material, on top of which are cemented sets of miniature columns each of which is about $\frac{1}{32}$ inch square. The arrangement gives a waffle-iron effect. Black glass is used to fill in the fine spacing between columns. Each column has a conductive coating on top and bottom; and a conducting layer is placed over the top conductive caps, connecting them together. With a.c. applied to the two outer conducting layers and a momentary spot of triggering light applied to any column, the electroluminescent dot under the column lights up. The feedback of light into this column is enough to keep the dot lit long after the triggering light is turned off.

Type III consists of a flat screen of conductive glass with three coatings: an electroluminescent layer, a photoconductive layer, and an electrically conductive layer. With a.c. applied to the conductive material and a light image applied or projected to the back of the screen, the picture is reproduced at the front of the screen with good definition. In its present form, this panel reproduces pictures optically, rather than by electronic stimulation.

Combinations of the present types are possible. One already known to *Sylvania* is a "combination of Types I and III which could electronically reproduce motion pictures."

The largest panels now being made are four inches square. Light output is so low that the panels are best viewed in a darkened room. Neither of these deterrents is considered to be long term, with panel size already being considered merely a matter of production facilities. Present panels have been made to glow in single colors, chiefly blue and green, but *Sylvania* points out that various colors

(Continued on page 103)

Pictures on a Flat Panel

(*Continued from page* 55)

can be used: "The only limitation is the color of the phosphors used." Present development of the *Sylvatron* panels has been carried on as a co-operative project by the General Engineering Laboratories of the manufacturer, located in Salem, Mass., and the Lincoln Laboratories of the Massachusetts Institute of Technology. With samples of the panels being made available to other interested manufacturers and laboratories, the opportunities for further developments are increased many times.

If some form of these panels is eventually evolved for use in monochrome TV receivers, the complete task will not end with the availability of the panel itself. Receiver circuitry, particularly with regard to presently used deflection methods, will have to undergo radical alteration. It is not expected that the panels will lend themselves to use with devices akin to present deflection yokes.

Among observers at the demonstration not connected with the *Sylvania* organization, there was considerable speculation on how presently transmitted synchronizing pulses could be used to provide scan across an electroluminescent panel. The feeling was that there are several methods to pick from, but whichever one was chosen would have to undergo considerable circuit development.

In one method, the electrically conductive horizontal strips coated on the back of an electroluminescent panel would correspond roughly to the raster lines. The vertical deflection voltage would be applied to a graduated delay line, which would be a vertical strip along one side of the panel (or two such strips, one on either side of the panel). In this way, the horizontal strips would be successively excited from the top of the screen to the bottom, in step with the video information transmitted for each line. In like manner, horizontally placed delay lines at the top and bottom of the panel would control a series of vertical strips running from left to right across the flat screen, and horizontal deflection across the panel would thus be obtained.

To produce color pictures, a technique similar to that used in the single-gun *Lawrence* tube might be successful. Alternating horizontal color-phosphor strips could be controlled by a series of electrically conductive strips behind the screen. The latter series of strips would replace the grid-wire structure now used for post-acceleration deflection.

Although application to flat-screen TV must remain speculative for the present, *Sylvania* foresees early use in radar displays, air-traffic control boards, tracking devices, computer memories, and computer readouts.

—30—

Radio & TV News, September 1957

Courtesy of Tom Carlisle