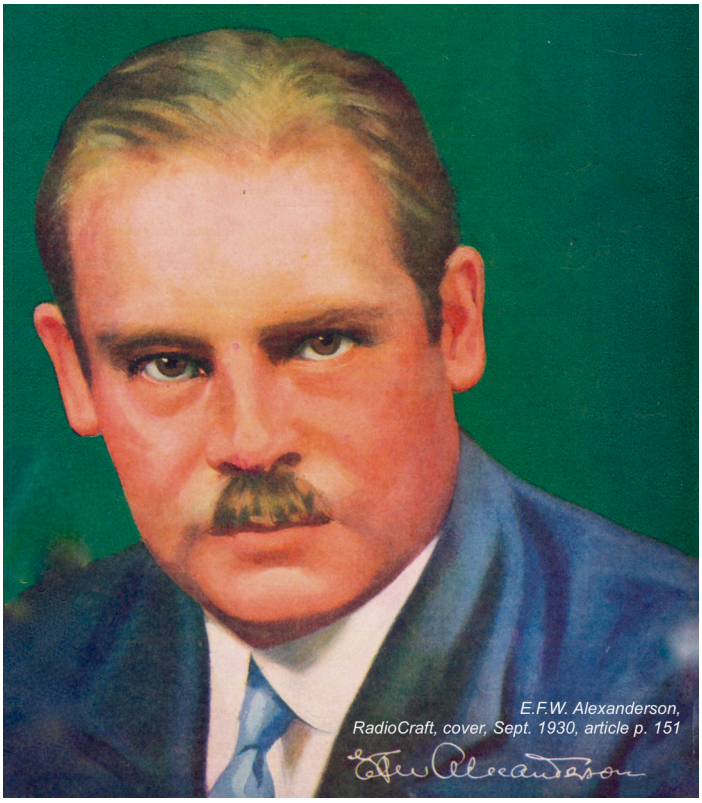
E.F.W. Alexanderson and Television — a path not taken

By Bart Lee, K6VK, CHRS Fellow, AWA Fellow

Ernst Alexanderson,* a Swedish engineer,† invented reliable long distance radio communications with his development of the mechanical alternator to generate high power long wave radio frequency carrier energy. General Electric's Charles Proteus Steinmetz mentored him. Radio station SAQ in Sweden still operates its alternator. He registered well over three hundred patents during his time with General Electric. After radio, he then turned to television.



E.F.W. Alexanderson, RadioCraft, cover, Sept. 1930, article p. 151

* See: https://en.wikipedia.org/wiki/Ernst_Alexanderson

† 1878 - 1975

Alexanderson worked hard on mechanical and electrical television for several decades.[‡] He favored electro-mechanical displays. He did not see much future in then-weak cathode ray displays, despite many inventors favoring them, *e.g.*, San Francisco's television pioneer Philo Farnsworth.

Introduction of the Kinescope 109

Ernst Alexanderson (left) and Ray Kell with a 1927 experimental home television receiver. *[L" is the scanning wheel, "J" is the light source, and "K" is the motor]*

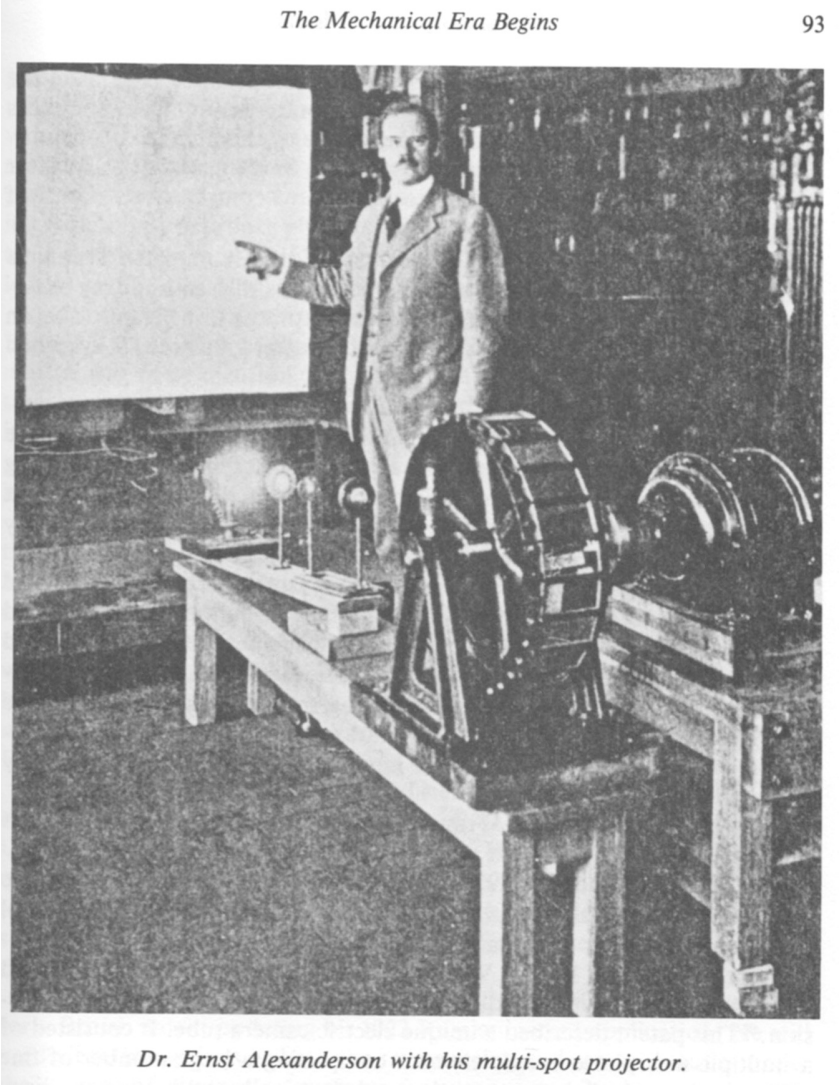
Engineer Ray Kell, pictured, developed both a screen 18 inches square, and a full-color system using only two colors.

[‡] See generally, Albert Abramson, THE HISTORY OF TELEVISION, 1880 TO 1941 (McFarland, 1987); the photo comes from Abramson's book — Kell's work was done in March of 1928 (pages 110-111).

Alexanderson is reported to have said about Farnsworth's system:

"Farnsworth had evidently done some very clever work, but I don't think that television is going to develop along these lines."[§]

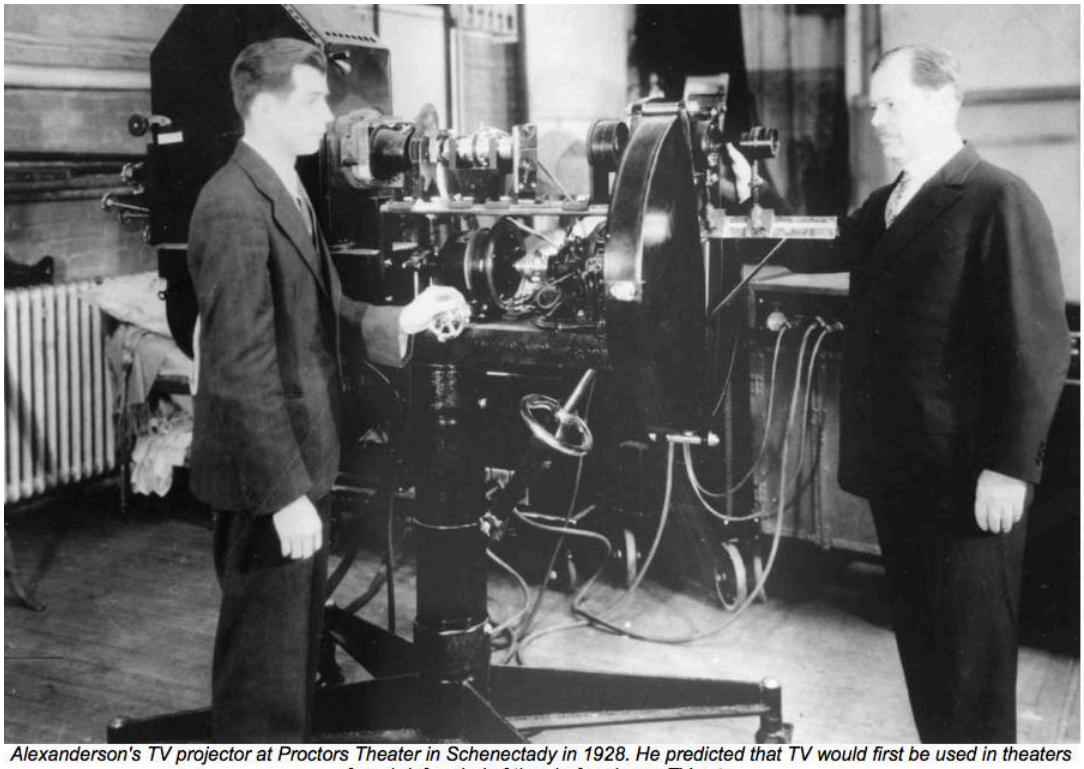
At about the same time (1926) that Farnsworth worked on his TV system, Alexanderson worked on his (starting in 1924). He put together a large projection system for mechanical image reproduction, his first television patent.[**]



Dr. Ernst Alexanderson with his multi-spot projector.

[§] Abramson, at page 151.
[**] Abramson, at page 93.

Alexanderson continued to focus on projection television.[††]



Alexanderson's TV projector at Proctors Theater in Schenectady in 1928. He predicted that TV would first be used in theaters for a brief period of time before home TV sets.

In 1930, Hugo Gernsback's *Radio Craft* magazine[‡‡] summarized Alexanderson television work to that date:

"In recent years, the most striking of his developments, as chief consulting engineer of the General Electric Company, have been those in the field of television, where he has been steadily building-up a technique which seems now, for the first time, to bring sight-at-a-distance out of the laboratory and into commercial possibility.

"Two years ago [1928], he took television apparatus out of the huge laboratories and set it down in the home; where representatives of the press and public were admitted to see moving images in the little screens of receivers which differed apparently in no other

[††] Photo from https://edisontechcenter.org/Television.html .
[‡‡] *Radio Craft*, Sept. 1930, article: "Men Who Have Made Radio — E.F.W. Alexanderson" at page 151, text quoted at page 181.

manner from those in their own houses. This was followed by the public exhibition of television images, almost full size, to the thousands who visited the radio world's fair in New York that Year. Those faint, flickering, but unmistakable shadow shapes seemed to bid their watchers wait yet a little longer, and television would be here.

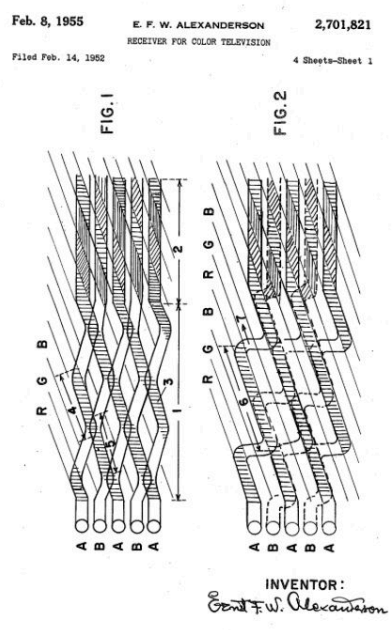
"The laboratory of such an inventor is no unobtrusive table in a corner; he who works on a huge scale must have adequate tools. A workbench ninety feet long, lining one side of a lofty room, down the center of which runs a traveling crane; dynamos, generators and the appliances of science on every hand; draftsmen and observers busy everywhere with measurements, sketches and calculations — so an eyewitness sees the sanctum where Dr. Alexanderson presides.

"Out of this workshop, a few days ago, came another surprise for the world. The television projector (pictured and described in the previous issue of *Radio Craft*) threw upon the screen of a theater, in the view of thousands, moving figures far larger than life, in detail better than ever. The engineer, whose life task has been to make large bodies move faster, has accomplished the same feat with even those incorporeal, phantom reflections of distant actors, which he threw into the ether, and caught from it again. Television had at last turned the corner!"

The Bell Labs also worked on large-scale television images, but using matrices of neon lamps. One goal for industrial television development seems to have been to get it into the pre-existing movie theaters, so popular in the 1920s and later. Some of the electronic industries of the 1920s and 1930s seem not to have foreseen widespread *at-home* reception of TV. But David Sarnoff at RCA had envisioned a home radio "music box" early on (1916, or so he claimed; more likely 1921); why not a home theater box? He demonstrated cathode ray television at the 1939 World's Fair in New York, to much hoopla.

As late as 1940, Alexanderson demonstrated a scanning wheel system, using two colors for full color (much like Kell's system). It used circumferential spinning color filters in front of a cathode ray tube.[§§] (This system, as described, seems close to the CBS system of triangular radial rotating color filters in front of a picture tube.) He demonstrated it to the NTSC group then evaluating television systems for national implementation (then the National Television Systems Committee). And then came World War Two, and the end of civilian television development.

After the War, Alexanderson persevered. In 1952 he patented[***] an all-electronic color television system, compatible with black and white transmission and reception as well. It turned on a complex system of linear color phosphors.



[§§] Abramson, at page 267.

[***] Patent 2,701,821, issued Feb 8, 1955: "A television receiver comprising a picture surface with red, green and blue lines oriented at an acute angle relatively to the scanning lines, means for scanning the picture surface with a light spot, three color detectors, one for each color produced by the light spot, means for amplifying the color signals, a three phase oscillator regeneratively locked in synchronism with the color signal [*etc.*]

But the RCA-Sarnoff Octopus, with its many arms, had beaten him to the punch. RCA used a metal mask system of hitting colored phosphors with the picture tube's electron beam. RCA, by its NBC subsidiary, started to broadcast color television in 1953, after a $100,000,000 investment (in 1950s dollars). RCA wanted to get television into millions of American homes, not hundreds of movie theaters, thereby selling millions of TV sets, as it had radios in earlier times. Black and white on small screens led the way. Color, on larger screens soon followed.

The 1947 Pilot three-inch cathode-ray screen television was a classic early and inexpensive entry into the consumer market.

RCA, of course, presented many an RCA television to that home consumer market as well, at, of course, higher prices, and presenting many programs from its NBC subsidiary. After all, "there's no place like home." Theater TV never caught on, and mechanical TV just went the way of the Dodo.

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