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MOTION IMAGING JOURNAL

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SMPTE BRAZIL

The First Broadcast TV Drama

By Richard Brewster

Introdução:

Se você, assim como eu, é um apaixonado pelas histórias que estão por trás da História, não pode deixar de se emocionar com o artigo desta edição. É uma verdadeira relíquia, capaz de proporcionar muito mais do que apenas aprendizado, mas também uma experiência emocional única. As páginas seguintes nos trazem um resumo incrível do desenvolvimento da televisão, que teve início no século XIX e foi inicialmente realizado como experimentos em laboratório. E é por isso que a documentação é tão limitada e rara, tornando artigos como este, ainda mais valiosos. Ela é uma verdadeira viagem no tempo, um privilegio poder ter um vislumbre dos oito meses que antecederam a primeira transmissão de televisão e conhecer detalhes sobre o equipamento utilizado, assim como as transmissões anteriores e subsequentes. É uma emoção indescritível poder mergulhar nessa história tão fascinante e aprender um pouco mais sobre a evolução da tecnologia que mudou o mundo. Por isso, não posso deixar de expressar minha gratidão por ter encontrado algo tão raro e valioso. Espero que todos possam se emocionar e se satisfazer com a leitura desse artigo incrível. E, acima de tudo, gostaria de agradecer ao editor Fernando Moura por nos trazer essa relíquia, que certamente ficará guardada em nossas memórias por muito tempo. Boa leitura!

Tom Jones Moreira

Abstract

Television development, which began in the 19th century, was typically pursued as laboratory experiments. Ernst Alexanderson's broadcast is considered a major step toward making TV a reality. A search for technical details concerning the historic 11 September 1928 television broadcast led to the Museum of Science and Innovation. The very limited documentation found in their files delineate steps taken through the eight months leading up to the broadcast and provide some details of the equipment employed. The broadcast of The Queen's Messenger as well as prior and subsequent transmissions were much more than lab experiments, but fell far short of being a medium of entertainment. Nevertheless, without the introduction of appropriate receivers, home TV entertainment would not have existed.

Keywords

Mechanical television, The Queen's Messenger

Nearly 100 years ago, the play "The Queen's Messenger" was televised on 11 September 1928.[1] Few were able to witness this historic event since there were only a small number of TV receivers; but it was the first broadcast of a television production (**Fig. 1**).

Audio broadcasting was still new, becoming a viable medium only eight years earlier when KDKA went "on the air" in November 1920.[2] TV was expected to follow shortly.

The radio transmission of moving images was generally agreed to be accomplished by sequentially sending individual "pixels," which would then be reassembled at the receiving end. Just how to accomplish this would challenge inventors for years to come. U.K.'s Campbell-Swinton had proposed a complete electronic system in 1908.[3]

On 13 January 1928, it was announced in a press release by C.D. Wagoner,[8] that radio television had leaped the barrier between the laboratory and the home in the first demonstration of television broadcasting, arranged by the Radio Corporation of America and General Electric Company (GE). Wagoner went on to explain that home television sets were set up in three different places in Schenectady, NY, including the home of the vice president of GE.

The most common method was by mechanical means, and experiments of this type had been ongoing for years. In England, John Logie Baird had demonstrated that images of faces could be transmitted and received in his London laboratory.[4] In the U.S., Francis Jenkins managed picture transmission as well.[5] Other work was going on in Japan[6] and Continental Europe.[7]

Typically, at that time, the object to be televised was scanned by a high-intensity spot of light and the reflection from the object illuminated photo-cells, which generated an electrical signal, proportional to the reflectance of the object. To "scan" the object, the spot of light swept across the object, usually by means of a rotating disk and lens arranged between the light source and the object. A series of holes, equal to the lines to be transmitted, was arranged in spiral around the disk, enabling the light spot to "scan" the object from top to bottom. A lens focused the scanning spot on the object.

At the receiver, the image was reconstructed by the modulation of a light source by a signal from the transmitter photocells. A rotating spiral-holed disk (similar to that at the transmitter) was arranged in front of the light and synchronized with the source disk. This caused the receiver light source to reproduce the transmitted image. The light source was typically an easily modulated neon bulb, thus the image had a red hue (**Fig. 2**).

Ernst Alexanderson, spearheading GE's TV development work, determined that he was ready to begin actual broadcasting. For the first time, TV experiments moved out of the laboratory and into the home.

Assista aqui um trecho do "The Queen´s Messenger"
https://www.youtube.com/watch?v=nP-rgKUzsUI

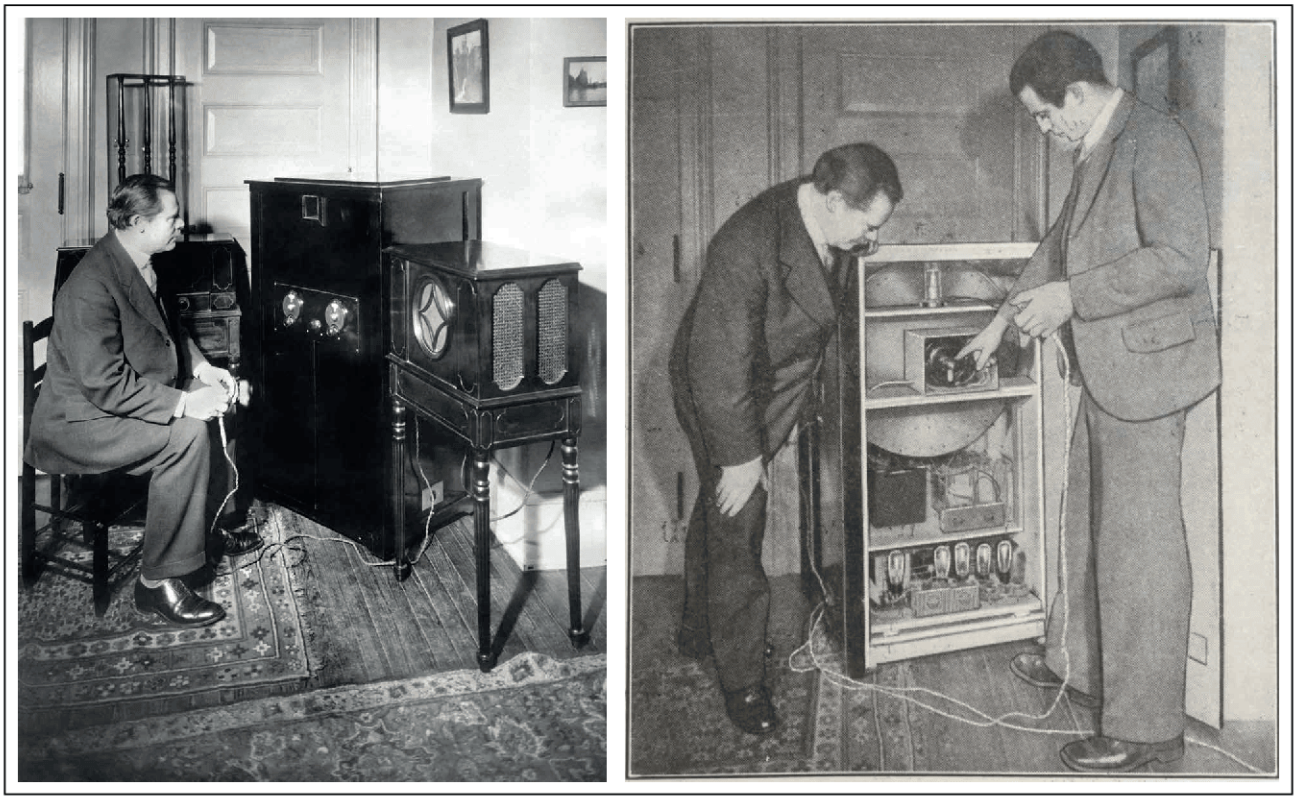

FIGURE 1. (a) Alexander viewing his 48-line TV receiver. In his hand is a switch and cable for interrupting the power to the disk motor. GE Photo #A-56912. (b) Rearview of the 48-line receiver. Vertically positioned neon tube atop with disk drive motor below. The TV receiver located below the disk with power supply on the bottom shelf. Television, vol. 1, no. 2, July 1928.

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According to Albert Abramson in *The History of Television, 1880 to 1941,* this was the first demonstration of television by radio using home receivers instead of laboratory instruments.[9]

That same day, *The New York Times* reported, "A diminutive moving picture of a smiling gesticulating gentleman wavered slowly within a small cabinet in a dark room." The *Times* also noted that David Sarnoff, general manager of the Radio Corporation of America, told visitors that they were to witness the demonstration of an "epoch making development."[10]

In a 12 April memo[11] from the Radio Consulting Laboratory of WGY, the issue of synchronization was raised. As noted earlier, the video image is disassembled, transmitted, and reassembled at the receiver. Since motors were used at both ends, the disk rotation had to be synchronized and in phase to properly reconstruct the image. GE's method assumed that the transmitter and receiver would be on the same power system. Nevertheless, to keep the image in view, the viewer had to occasionally interrupt the power to the disk motor.

The following month, Meenan of General Electric issued an announcement noting that on Friday, 11 May "*WGY, the Schenectady broadcast station of the General Electric Company, has inaugurated a regular schedule of television broadcasting. Three afternoons a week—Tuesday, Thursday and Friday afternoon from 1:30 until 2 o'clock, eastern daylight time—television programs are being broadcast over the regular wave of WGY, 379.5 meters or 790 kilocycles … WGY becomes the pioneer television broadcasting station in the country.*" He further noted that the transmitted image would consist of "*... 24 lines, repeated 20 times per second.*" And that, "*Television radio signals, when made audible by the ordinary radio receiver, produce a high-pitched note intermittently interrupted as the subject transmitted moves about before the eye of the television transmitter.*"[12] Clearly, both 24- and 48-line systems were being evaluated.

An internal memo, from the Radio Engineering Department, titled, *Television Apparatus,* dated 26 June, detailed the design of the television apparatus being built.

(1) Twelve 24-line receivers, each consisting of a "Telopticon," Radiola-18 (for TV reception), a short-wave receiver for voice reception, as well as speaker and

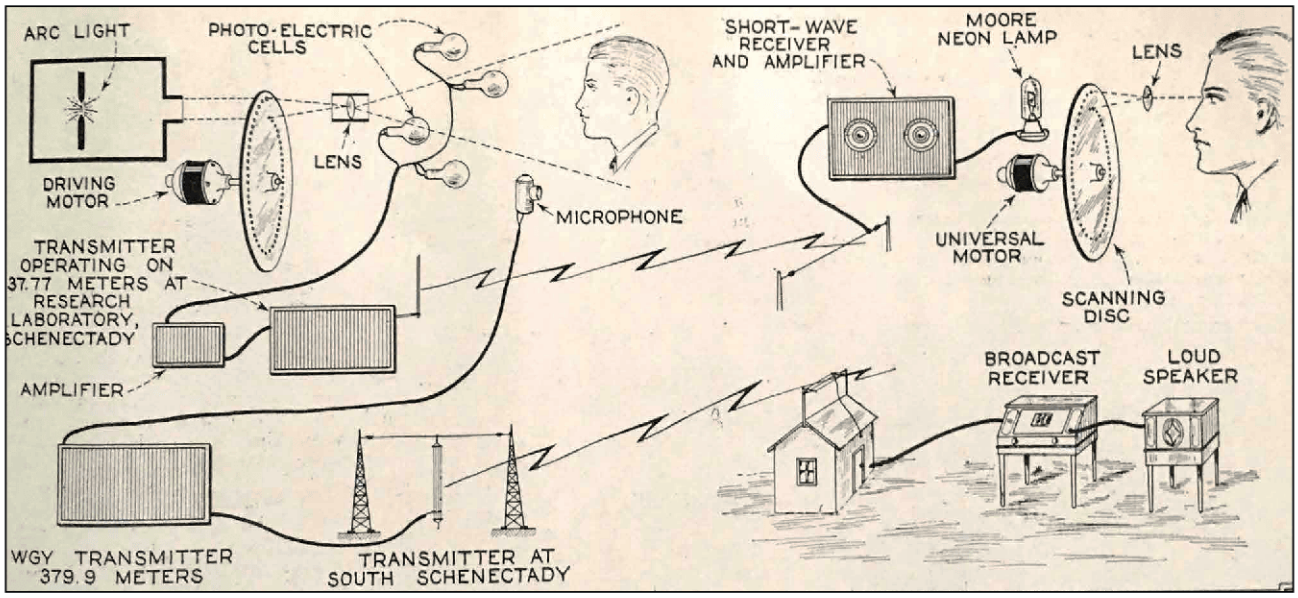

FIGURE 2. Drawing describes a typical mechanical television system in use into the early 1930s. The light source in upper left is typically a carbon arc. Its light is focused on a rotating disk with a spiral of holes in its periphery. As each hole is sequentially illuminated, the spot of light formed is focused (lens not shown) on the subject. As the disk rotates, each hole describes a line in the image to be televised. Thus, the number of holes in the disk determines the number of lines in the picture. The speed of the disk defines frames/sec. Reflection from the subject illuminates the photo-electric cells, producing electrical impulses. These are sequentially transmitted to the receiver. The picture is reconstituted by the illumination of the neon lamp displayed through holes in a disk similar to and synchronized to the one at the transmitter.

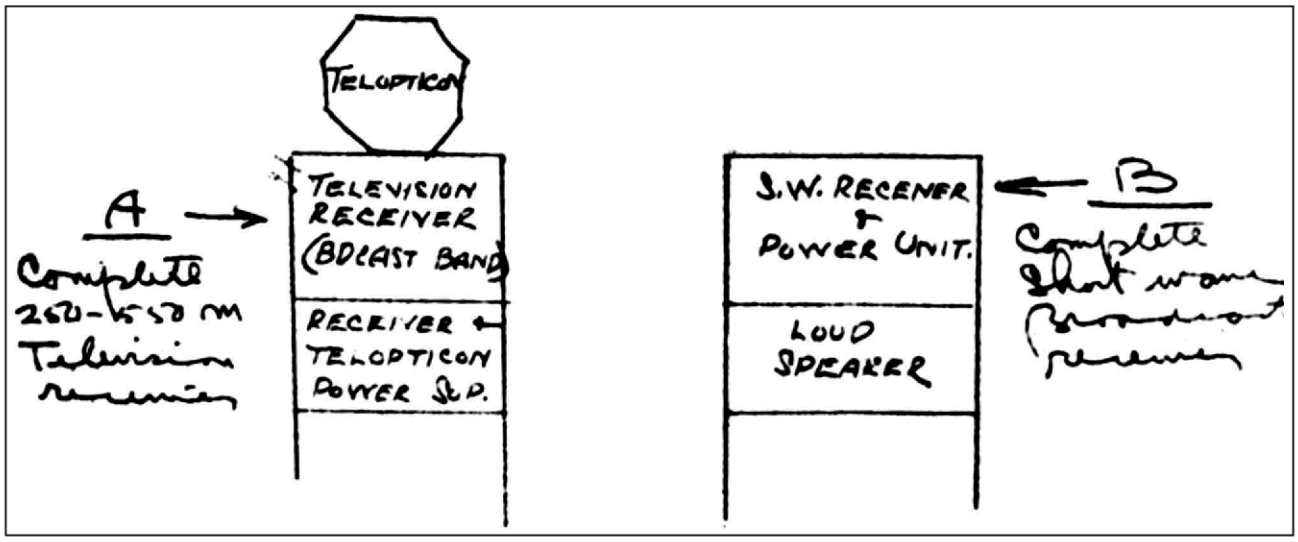

FIGURE 3. "A" is a sketch of one type of receiver used. The Telopticon atop the Broadcast Band receiver contains the neon tube, the disk with a spiral of 24 holes, and the drive motor. The cabinet below houses the television receiver as well as the system power supply. "B" is shown to contain the short-wave receiver for the sound portion of the program as well as the power supply and loudspeaker [Fig. 4(a) and (b)].

power supply. They would be allocated for various individuals, including studio monitoring.

(2) Eight 24-line TV transmitter devices, four of which would be similar to ones previously laboratory-built, while the other four would have some additional design features. Again, these were to be allocated to individuals with two assigned for use in the WGY studio.

(3) Three 48-line receivers intended to be used for 'propagation data' in New York City."[13]

In late July, Alexanderson had written to Hugo Gernsback, thanking him for sending the first issue of Gernback's "*All About Television*." He proceeded to laud the editor's work and requested a subscription to the magazine.[14] The second issue of *Television* had an article about Alexanderson's work and included a drawing of Gernsback's understanding of WGY's TV system (**Fig. 2**).[15]

Note: Alexanderson's system used only two large photo-cells. High-intensity incandescent lamps are assumed to have been employed, since carbon arc illumination produces toxic fumes, typically vented externally. The author has experimented with

PHOTO R. BREWSTER, JACK DAVIS COLLECTION.

FIGURE 4. (a) "Telopticon" on top of the television receiver contains the neon tube, the disk with a spiral of 24 holes, and the drive motor. The cabinet below houses the receiver as well as the system power supply. "B" is shown to contain the short-wave receiver for the sound portion of the program as well as power supply and loud speaker. (b) Telopticon and receiver, rearview. The neon lamp can be seen, horizontal, at the top. The 24-hole disk and motor below. The broadcast band receiver underneath with the power unit at the bottom. Compare to Sketch A in Fig. 3. (Courtesy of the MZTV Museum of Television.)

GE ARCHIVE PHOTO WGY-482.

FIGURE 5. The right of the photo shows the "props" camera and the two people whose hands were reproduced. Props included revolvers, cigarettes, keys, rings, and so on. Above their hands is the "flying spot" projector, incorporating a light source, rotating disk, and lens. Behind each of the seated people are photo-cell boxes. In the center of the photo is a second similar camera setup.

such an arc projector. Drawing from Television, vol. 1., no. 2.

On 8 August, a memo[16] was sent to Alexanderson with sketches of the 24-line TV receivers, as well as the short wave voice receivers (**Fig. 3**).

On the evening of 11 September, according to a GE press release the following day, "…WGY…presented the first drama by television, three portable cameras or transmitters were used…"[17]

According to the *New York Herald Tribune*, "...Director Mortimer Stewart [center] stood between the two television cameras that focused upon Miss Isetta Jewel, the heroine [far left] and Maurice Randall, the hero. In front of Stewart was a television receiver in which he could at all times see the images that went out over the transmitter; and by means of a small control box [white box] he was able to control the output of pictures, cutting in one or another of the cameras and fading the image out and in."[18]

The "Telopticon" unit is being used as a monitor with the operator shown just to the left beside it (**Fig. 4**). Also,

it would appear that a carbon arc light source was not used as there is no indication of any "vent chimney" atop the projector (**Fig. 5**).

Note: lighting other than the "flying spot" would obviously bias the photo-cells, reducing their effectiveness. Thus, it can be assumed that the room was dark, except for the projected "flying spots." This was confirmed by the author's interview with a 1931 CBS TV actress, Natalie Towers: "…Did they have all the lights off in the room…?" "Yes, yes, they did…and it was dark."[19]

The play was J. Hartley Manners' "The Queen's Messenger." The play was presented exactly as offered on the stage.[17]

The following day, *The New York Times*, 12 September 1928, reported that, "*Play is Broadcast by Voice and Acting in Radio-Television*." The article stated that an audience of scientists and reporters viewing the program from a nearby building claimed that "*The pictures were small, sometimes blurred, not always in the center of the screen and hard on the eyes because of the flicker.*"[20]

A number of distant reports (not specifically referring to the play) were subsequently received by GE.

From Richwood, OH: "I received your television signals this evening with great clarity and volume."[21]

From Grosse Pointe, MI: "I tuned in WGY last night about 11:45 p.m. and found your signals were coming in strong, and by careful tuning of my scanning disk, I managed to frame your picture…the figures on my plate were about one-half inch high."[22]

From Monroe, MI: "I would describe pictures received as those of acrobatics and dancing…The pictures were held with little trouble for the half hour."[23]

Alexanderson was definitely pushing the limits of the available technology. By all accounts, the received image was very poor. Entertainment value was nonexistent. But it was a bold step forward.

Post-Script

Subsequent to the experimental broadcasts by Alexanderson, television development was moved to RCA labs in Camden, NJ. RCA continued development of the "mechanical" system for some time. No further broadcasts were made by GE. RCA did build several "flying spot" camera systems, one of which was employed by CBS in 1931 as described in the October issue of *Television News*. See "Columbia is Telecasting," *Antique Wireless Association, Old Timer's Bulletin,* July 2004.

Less than a year after the Alexanderson broadcasts, in 1929, at the Westinghouse labs in Pittsburgh, Vladimir Zworykin was able to transmit TV images to a completely electronic receiver. The following year he, too, moved on to Camden and continued work on TV development, eventually perfecting a fully electronic television system.

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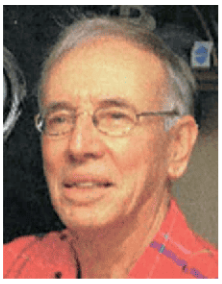
GE documentation courtesy Museum of Science andInnovation, 15 Nott Terrace Hights, Schenetady, NY.

About the Author



Richard Brewster received a BSEE degree in 1960. He spent most of his career as a nuclear power engineer. After retirement, he volunteered for several years on a hospital ship in West African countries, eventually as acting chief radio officer. He was the television editor of *Antique Wireless Association Journal* for 20 years. Until recently, he served as volunteer project engineer during the construction of the Mercy Ship's 37,000-ton hospital ship Global Mercy. He constructed an operating replica of the 1919 Eccles-Jordan Flip-Flop using period components leading to a paper published in the June 2018 issue of *IEEE Spectrum*. He also published *Built for Battle,* the story of the WWII Handi Talkie, in October 2020. He previously researched and constructed a working replica of a circa 1930 flying spot television camera using vintage components, a Peerless Carbon Arc Projector and 6 in. photocells.