

AUSTRALIA'S FIRST LICENCED TELEVISION STATION

Reprinted from the Melbourne "*Herald*", Thursday 5th December, 1935.

In an old windmill tower, a relic of the days when Brisbane was a tiny penal settlement for "thrice convicted felons", I witnessed a convincing demonstration of television. The tower is the studio of Mr Thomas Elliott, who claims to be Australia's first television transmitter. From this novel studio, Mr Elliott daily transmits his images. In and around Brisbane, a dozen enthusiasts who have constructed receiving equipment are "looking in" every day. After only three years of experimenting, Mr. Elliott is able to transmit images that, in my opinion, are suitable for public exhibition.

As every broadcasting station checks its transmissions with a receiver that indicates what is being heard by its listeners, so in this studio a monitor television receiver reproduces the images and indicates what is being reflected on the screen of the lookers-in. These screens range in size upwards from two inches by five inches. Any distortion in transmission is revealed on the screen of the monitor.

A switch clicked, electric motors whirled, huge valves blinked dully, and the television station was on the air. A cataract of flying white dots on the screen resolved itself, as the transmitting apparatus steadied and equalised into the clearly defined, smiling face of Janet Gaynor. The picture was followed by a dozen others, all equally clear and all as sharply defined. Then there flashed on the screen the crossword puzzle from a local newspaper, on the page of which all the dark type headlines could be read. All that I saw on this screen was being seen as clearly on the screens of the receiving sets away in the suburbs. The equipment used for these transmissions is a scanning disc electrically controlled to ensure synchronisation. The subject is illuminated by a whirling dot of light produced by a powerful arc lamp behind the disc. This light is placed so that its reflection on the image influences photo cells connected to electrical amplifiers, thus ensuring perfect frequency response.

So delicate is this equipment – it is even more delicate than broadcasting equipment – that the slightest degree of distortion blurs the picture. Passing through the ether as electrical impulses, the image is re-converted into light by the receiving set. Eighteen months ago Mr. Elliott's 30 line (low resolution transmission) television was being received, though in an indistinct form, in Melbourne. To increase the definition of the reception it has been necessary to reduce the wavelength, and 180 line transmissions are being made on an ultra-short-wave of five to seven metres, with a radius of 25 miles. A new machine, known as the mirror drum and similar to others in use in England and Germany, is being constructed by Mr. Elliott, which, while requiring less arc power, will provide an even greater illumination and sharper definition. His transmitted images are surrounded by a slight whitish border not unlike a water mark, and which, with lettering resembles the shadow effect used in sign-writing. In England and Germany a similar deficiency is being experienced, and nothing, so far, apart from the re-touching of the subject, has been discovered to overcome it.

Experimenters abroad also find that the result of the direct transmission of a human face is an image half negative and half positive, indicating the need for heavy make-up. Sharp, almost perfect definition is possible only when the lips and eyebrows are painted a very dark brown. Until this difficulty is overcome, the direct transmission of more ambitious subjects will be unsatisfactory. In England, the system of achieving animated pictures by means of films dried by a rapid drying process in eight seconds, and projected through a biograph attached to the television equipment is now being superseded by an iconoscope which has a direct camera pickup. The scope of this method, however, is also limited, because of the mystifying haze which permits its use only where the object to be televised has the benefit of exceptional illumination.

The most gratifying feature of Mr. Elliott's research is the comparison of his results with those obtained in Germany, where one million pounds has been spent, and in England, where television research has cost hundreds of thousands of pounds. While the images received abroad are shaded pink, violet, and pale green, those in Brisbane are black and white – the result of a lamp Mr. Elliott has invented to give this effect. This lamp; a rare gas vacuum modulating tube, on which a patent is pending, is used instead of the system which, abroad, is producing false coloured images.

In March, ten television stations are to be established to service all England, and it is possible that next year equipment will arrive in Australia from England or Germany. Even now, Mr. Elliott claims that his experiments have reached a stage where it would be possible satisfactorily to transmit televised images to the greater part of Australia. In Victoria, for instance, he told me that with an ultra-short wave station in the highest point of the city, preferably the tower of the Manchester Unity Building, it would be possible for Melbourne to have television. As one of the inexplicable characteristics of this 7 metre wave length is that its radius is equal to the focus of the human eye, it would be possible, with other stations on Mt. Dandenong, Mt. Macedon, and the You Yangs at Little River, to re-transmit these images by reflectors to the country districts within the ambit of these points. Similarly, a short wave station in the Blue Mountains could satisfactorily serve Sydney. Australian wide television of low definition would be possible today, Mr. Elliott contends, if all the radio stations of the Australian Broadcasting Commission were inter-linked. Only one studio would be needed to enable national transmissions to be made over the ordinary landline through the national network.

Notes from researcher (Dr. Bruce Carty): 4CM testing included Mickey Mouse in a cartoon, followed by film star Janet Gaynor on 10-4-1934, using a Baird 30 line system. 4CM then launched one hour a day of television transmissions including silent movies, using all home-made equipment. On 6-5-1934 a demonstration of their television system was conducted for Federal and State politicians. This resulted in **4CM being granted the first television licence in Australia** on 1-7-1934 using 2,200 KHz. By then they were transmitting 180 lines, with their 100 watt converted radio transmitter. Their telecasts were seven days a week for one hour from 7-30 P.M. The scanning wheel system being used operated at 750 revolutions a minute in an anti-clockwise direction with vertical scanning being employed. For the first ten minutes a black triangle was transmitted and this was followed by a black spot. This allowed viewers time to synchronise their receiver with the transmitter to obtain the best definition. 4CM-TV presented **the first Australian news telecast**, being several *Courier Mail* pages on 9-10-1935.

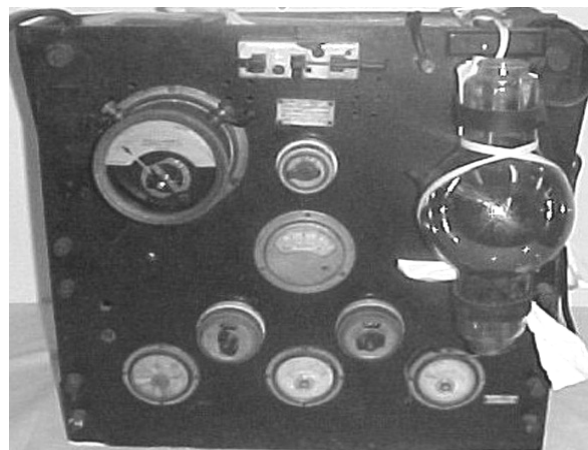
By 1939 there were 18 home built television receivers in Brisbane, and their television signal was often received in Melbourne. Their television licence was cancelled in 1939 when WWII started, due to security concerns. The original television equipment used by Thomas Elliott and Dr. Val McDowall used to be on display in the 1960s at Newstead House in Brisbane. A recent photograph of the dismantled equipment on a storage rack at the Queensland Museum has surfaced. Thomas Elliott also experimented with x-rays, was a radiology consultant to the Queensland Government, and the first Chief Engineer of commercial station 4BC.

Bruce Gyngell, often promoted as the first face on the first licensed Australian television station, (TCN-9) admitted that this was not correct, and praised the pioneering achievements of licensed amateurs experimenting with 4CM-TV during an A.B.C. radio interview.

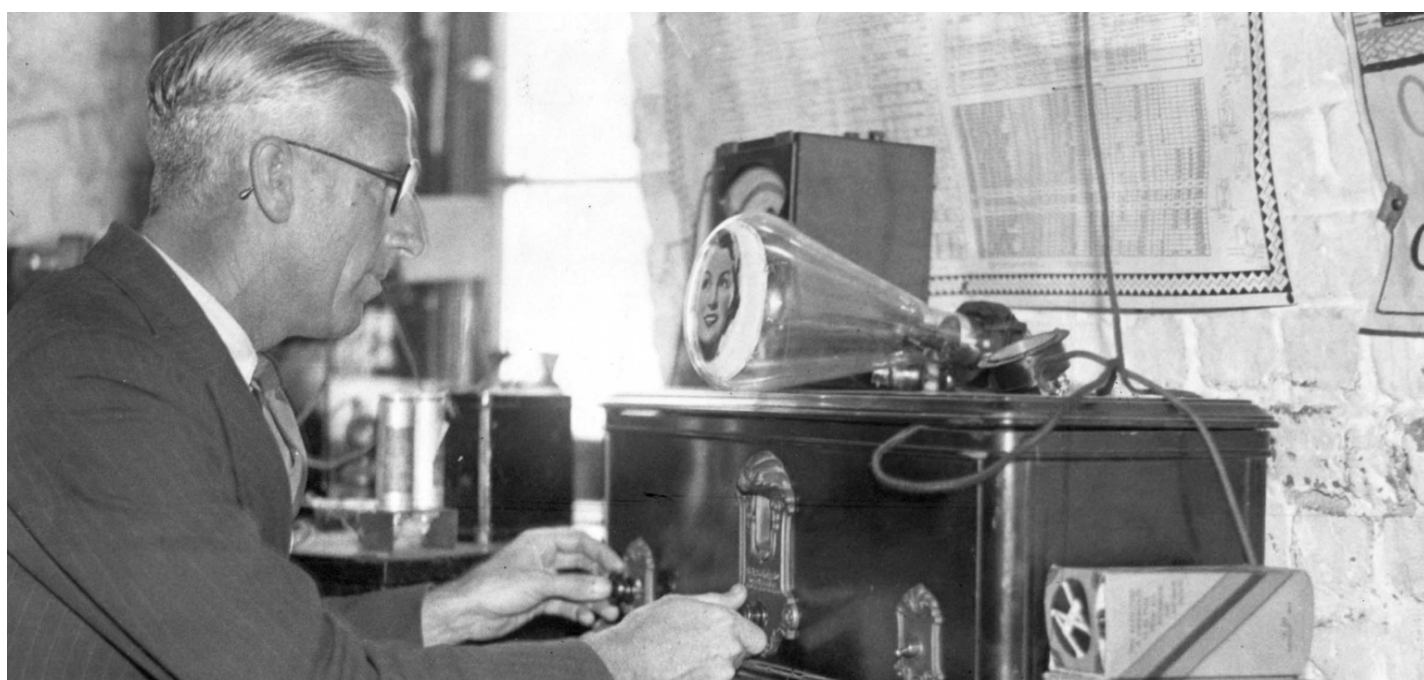
John Logie Baird visited Sydney in 1938 for the World Radio Convention. He hoped to create interest in the establishment of a television station in Sydney at a cost of £250,000. He admitted that a high power television transmitter would weigh around 50 tons. **John demonstrated colour television in Australia for the first time** while in Sydney. He used a scanning disc with three sets of holes covered red blue and green, instead of one set of holes. The basic theory of Baird's initial mechanical television tests, and the basic design of the scanning disc and its magnetic synchroniser, using a Faraday cell, was first published by the German Paul Nipkow, in his German patent 30105 application dated 6th January 1884.



4CM television equipment in storage at the Queensland Museum



The 180 line TV transmitter at radio 4CM.



Thomas Elliott in 1934 monitoring the first transmitted picture of a person on Australian TV (actress Janet Gaynor).

OTHER EARLY TELEVISION EXPERIMENTS BY RADIO STATIONS

- 5CL:** Manager A. Brown experimented with 'Telephotography' (sending still pictures by wireless) in 1928.
- 2UE:** Chief Engineer, Cecil Stevenson, first experimented with television (earlier called 'radiovision') in 1929. Cecil finally stopped only due to a lack of suitable receivers.
- 3AR:** Their Chief Engineer, Donald McDonald, for the Television and Radio Laboratories P/L, used the transmitters of 3UZ and 3DB late each night in 1929 for television experiments. One transmitter was used for sound and the other simultaneously for 24 line vision. Donald also experimented with Baird's Televisor system (first theorised by Paul Nipkow using a Faraday cell).
- 5DN:** Their 1929 application for the first television licence in Australia was rejected.
- AWA:** In 1930 they announced that 2FC and 3LO would soon launch television transmissions. They even ordered 5,000 receivers from the U.K.
- 3KZ:** In 1932 they stated that "*Television will never be introduced into Australia*".
- 2BV:** The Waverley Amateur Radio Club in Sydney experimented with transmitting television from North Bondi to Waverley in 1933. This amateur radio club still exists as VK2BV. Development was conducted by A.V. Pickering (VK2KI), using a 30 line system on 2,200 Khz. The screen size was two and a half inches square.
- AWA:** They sent the first black and white wireless picture from Australia to England in 1934, and the first colour picture in 1946.
- 2KY:** General Manager Emil Voigt stated in 1935 that "*Australian commercial and Government radio stations will shortly introduce television transmissions*".
- 6GS:** In 1936 licensed amateur Blake Horrocks experimented with a 30 line system (88 lines by 1939), using plans drawn up by Ballarat experimenter Henry Sutton. He also developed a one inch cathode ray tube.
- 3JU:** Owner Ross Hull died in 1938 by electrocution off his experimental television receiving equipment. He was earlier editor of "*Wireless Weekly*".

ELECTRIC TELEVISION

Reprinted from the "Daily Standard" (Brisbane) 2-5-1925.

The problem of reproducing visible images at a distance by electrical means is one that has appealed to the inventor as the logical outcome of the transmission of speech and music, which is now so popular a development of wireless telephony. The man in the street has a most confused idea as to what television really is, which, after all, is not surprising. There has been a quite understandable mistake current in the confusion of electric telephotography, being the mere copying of a fixed picture, and television, which is, of course, the art of seeing the living scene in its actuality.

Years ago photography was a great marvel, and the ultimate development of the art has materialised in the production of living pictures. These, as is well known, are a reproduction of past scenes, and bear the same relationship to television as the gramophone does to wireless telephony; i.e. the reproduction of permanent records of bygone events.

What the inventor is attempting to achieve is the simultaneous transmission in intensity, in proportion to the intensity of the light waves. These feeble currents are passed through six stages of low frequency amplification, and if a telephone is placed in circuit, varying notes are audible, ranging from a deep note at the darker end up to a shrill whistle at the lighter end of the scale. If a neon or other suitable lamp is put in circuit in place of the telephone, a pulsating illumination is set up, varying in intensity with the light which is reflected from the various portions of the transmitted image. At this point we naturally receive only a series of light waves which, while representing the light values of the image, convey no meaning to the eye. To build up the disintegrated image we have to fall back on the physical property of the human eye known as "persistence of vision".

Just as in radiotelephony we must have the "electric ear" – the microphone – so in television we require the "electric eye" which is bestowed upon us in the element selenium. This mineral possesses the remarkable quality of changing its electrical resistance in response to the action of light; very much as the microphone varies in resistance in response to sound. Very considerable progress has been made in the Baird system of television, which in its present state is capable of transmitting images and reproducing them in visible form by electric means.

In the Baird system, the image is picked up by a revolving disc, on which is mounted an optical system of 16 lenses arranged in spiral form. These lenses traverse the image and feed it piece by piece through a revolving serrated disc, which sets up "beats" of light on a light sensitive cell. A local battery in this circuit therefore sends feeble currents which naturally vary as does cinematography, which gives the beholder the impression of "living pictures". A third revolving disc is employed in which slots pass in rapid succession between the eye and the illuminant. This "integrating" disc builds up the image again which, after being passed through the circuit as a series of electrical impulses, appears to the eye in its original form.

So far as the principle has been seen demonstrated by the writer, conductors have been used between the transmitter and the receiver. The system, however, has been reduced to two wire working, and, as it is only necessary to send "notes" representing light values, the transmission of the image by wireless over distances within the bounds of pure telephony appears to be perfectly feasible.

For projection on a screen, the slots in the integrating disc would be replaced by an optical system similar to that employed in the transmitting disc, and a high power illuminant used. This, briefly, is the principle of this interesting contribution to the science of television, which, in the near future, promises to bring the distant scenes into our homes by the agency of wireless.

In conclusion, it should be noted that the system described is capable of transmitting images by reflected light, rather than only silhouettes or shadows. This elementary stage has been passed and, while the results are at present admittedly crude, and produced by apparatus which leaves much to be desired, the system does at least demonstrate the practicability of its claims in reproducing actual images. These crude facts are worth any amount of academic speculations often voiced by the high-brow and the dreamer.



Some examples of early Australian television station logos.