**Don McLean reveals how a home-recorded videodisc made in 1933 challenges established views on the quality of Britain's first Television Service.**

# First frames

Few people today realise that the BBC Television Service started broadcasting in 1932. Programmes were at that time transmitted on the early Baird standard of 30 lines per picture. Today, this first BBC Television Service is largely forgotten, overshadowed by the tremendous technological achievement of electronic television.

As far as most people are concerned, BBC Television started in 1936. The perceived wisdom is that any earlier transmissions were so poor as to be not 'television' as we know it today. The BBC, partly through long-forgotten prejudice and partly through ignorance, has over the years reinforced[1] a vision of poor quality in both content and technology.

Today, it continues to dismiss its heritage of making excellent programmes. While the 30-line system did indeed give a crude image, the mistake is in assuming that the programmes were just as crude. The image we have been handed down over the years is of amateurish production, stilted performances and stiff presentations.

A home-recorded aluminium 78rev/min audio disc, **Fig. 1**, with "Television 1933" hand-written on the label, has recently been restored using computer-based image processing. The recovered pictures give us our first-ever view of what people watched on television. In doing so, the disc challenges the half-century-old myth of poor quality. BBC 30-line television programmes were professional, slick, full of movement and packed with entertainment.

## Before TV, there was... television

In the years after his string of 'firsts' in television, John Logie Baird's attempt to promote television and encourage broadcasting failed to impress the BBC.

Elsewhere, notably in the USA and Germany, similar systems to Baird's received national commitment. Such support allowed those countries to advance their capability in the new medium. This challenged – and occasionally beat – Britain's hard-won head start.

After much lobbying, the Baird Company started and funded its own experimental television service in 1929 using the BBC's existing radio transmitters. This was the world's first television broadcasting service with regular scheduled programmes.

Eventually, the BBC came round to support the idea of its own television service. In August 1932, with equipment leased from the Baird Company, the BBC Television Service began regular broadcasting, **Fig. 2**.

Developed in the twenties when there were no practical alternatives, Baird's mechanically scanned 30-line television

*Fig. 1. An enthusiast made the earliest known 'home video' recording in 1933 onto an aluminium disc intended for audio. The extensive damage caused by corrosion shows up as light patches on the disc surface.*

B.B.C. TELEVISION
BEGINS TO-NIGHT

FIRST PROGRAMME TO BE CONTROLLED BY BROADCASTING HOUSE

BY OUR WIRELESS CORRESPONDENT

To-day, August 22, 1932, will be a date long to be remembered

B.B.C. TELEVISION STATION OPENED

CEREMONY SEEN SIX MILES AWAY

By L. MARSLAND GANDER, Our Television Correspondent

The opening ceremony of the B.B.C. television station at Alexandra Palace was seen and heard in THE DAILY TELEGRAPH office, Fleet-street, yesterday afternoon,

*Fig. 2. News-clippings show that the BBC Television Service started first in 1932 (above) then again in 1936 (below). Today, the BBC dismisses its first television service – a case of modifying history?*

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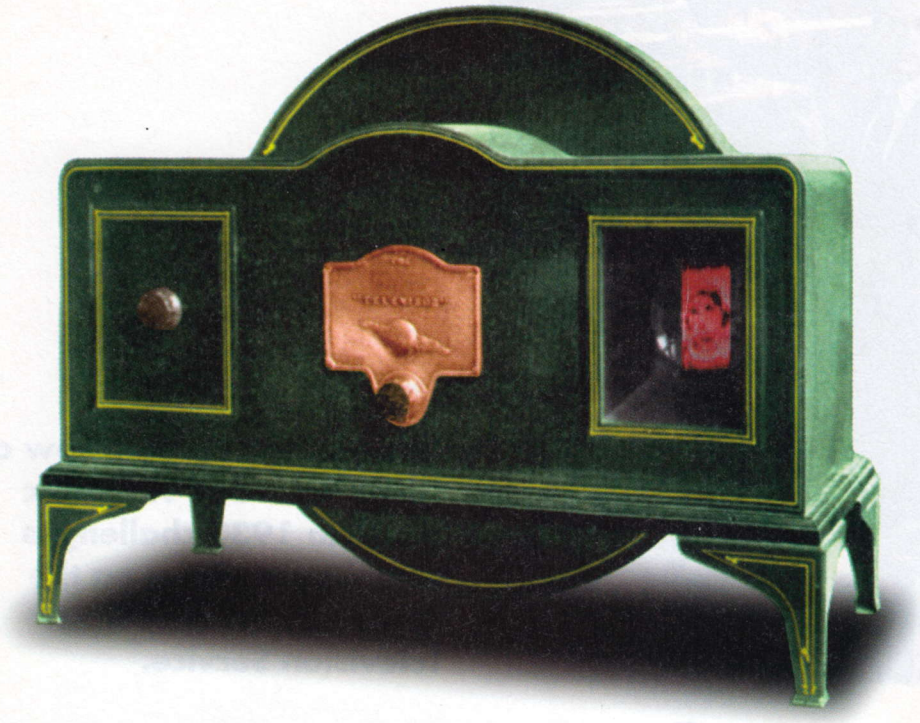


*Fig. 3. The Baird 'Televisor' was a display device driven by the 30-line video signal from a dedicated radio receiver. Despite the maturity of 30-lines, 'Televisors' such as this one were expensive – equivalent to nearly £500 at today's prices – and only 1000 were sold. As a result almost 90% of all viewers in the UK built their displays from kits.*

system was, in 1932, mature, **Fig. 3**, rather than experimental. Long gone were the bits of plywood, 'bulls-eye' lenses and bicycle chain – the "pile of junk"[2] image that TV journalists still love to promote for that whole pre-1936 period.

The engineering was now of the best quality, limited only by the 30-line format. And thirty was the maximum number of lines that could fit the permissible bandwidth on the medium wave band – the only available band for television broadcasting.

Despite its age, Baird's 30-line system was the only 'off-the-shelf' system available. High definition television and ultra-short-wave transmitting hardware were still under development.

The BBC called its service 'experimental', despite the term being incorrect.[3] The service was 'experimental' only in the sense that new programme-making techniques were being explored. Also, with major developments underway, this was going to be a temporary service.

## The 'lost' television service

After two years of broadcasting, the BBC in 1934 strengthened its commitment to the 30-line service due mostly to public support voiced through the press. Throughout the industry, major new television developments were being made.

The Baird Company's interest in 30-line television was collapsing. Even though it had the option of stopping the service, the BBC surprisingly continued its programming output, moved to a larger studio, **Fig. 4**, and enhanced the system's quality and performance.

Coverage from the BBC's medium wave transmitters meant that reception was possible – but not intended – across most of Northern Europe. Under special atmospheric conditions, viewers watched BBC television as far away as Iceland and North Africa with excellent clarity.[4] Enthusiasts built dual standard mechanical television sets at least in Scandinavia, **Fig. 5**, and the Netherlands for transmissions from different countries – notably Germany and Britain.

Our knowledge of how good the programmes were in this period is very limited and subjective. Prior to this and the 'Phonovision' restorations,[5] the only material available was from first-hand descriptions and from press reviews of programmes.

The dimness of the tv display meant photography was difficult. Off-screen stills of transmissions never satisfactorily showed the perceived quality of the moving image, **Fig. 6**.[6]

At the other extreme, the public's expectations were raised rather too high by fabrications of exceptional quality, **Fig. 7**.

## The earliest recording of broadcast tv

True video-recording technology was decades away.[7] The narrow bandwidth of Baird's 30-line vision signal meant that most of the signal would be preserved if it were recorded onto a conventional audio disc. Baird had attempted this in the late twenties.[8]

In all these years of broadcasting, neither the BBC[9] nor Baird had tried to record their broadcast tv programmes. The engineers were probably put off by their knowledge of the distortion caused by recording – unstable synchronisation and phase errors.

Fortunately, at least one enthusiastic viewer thought otherwise and set about recording a video transmission. Although he was probably disappointed with the result, he fortunately held on to it.

Recently a private collector[10] discovered this recording. One of a collection of privately recorded discs he bought at a stall had "Television 1933" written on the label. The aluminium disc had been recorded using the consumer 'Silvatone' process, **Fig. 8** – one of many domestic recording systems available in the early thirties.

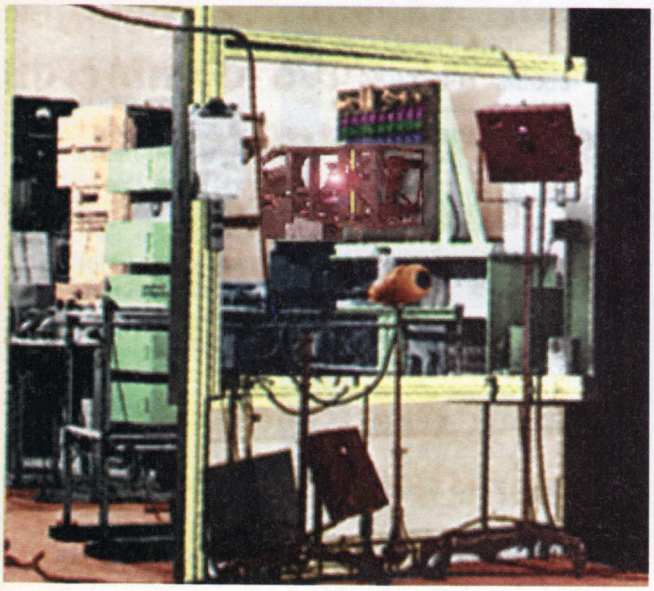
The disc was physically unplayable, being highly corroded and badly recorded. Eliot Levin of Symposium Records professionally and painstakingly transcribed the disc.[11]

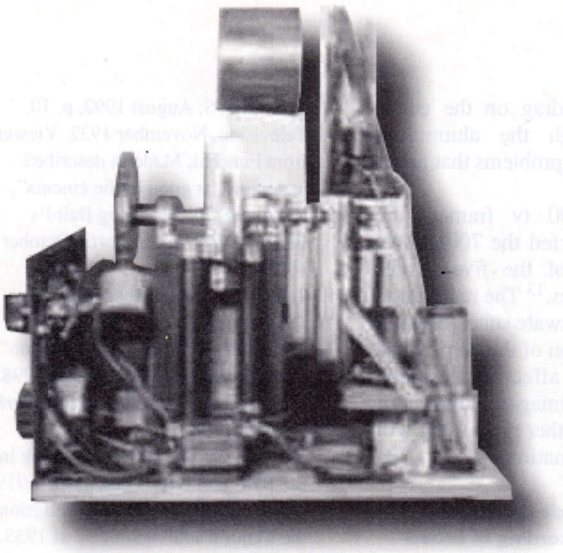
I was able to confirm that this was a 78rev/min recording of Baird standard video at 30-lines per frame, 12.5 frames per second. It had no audio. Unlike Baird's 'Phonovision' recordings of the late twenties, this recording had no arc-scan distortion. This meant that a mirror-drum camera was used, dating this disc later than about 1931.

## Vision restored

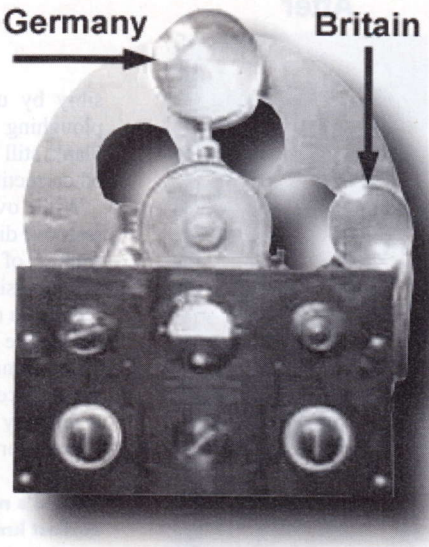
The massive and complex phase errors, high surface noise and occasional gaps were all a major challenge to restoration. All processing was done in software, custom-designed for the disc's

*Fig. 4. After two years of broadcasting programmes from the basement of BBC Broadcasting House, The Television Service moved to a larger studio in facilities nearby in Portland Place.*





Side View




Front View

*Fig. 5. Side and front views of a kit television display designed for dual-standard reception for continental viewers. This one was used in Sweden for watching television from Germany and from the BBC in London.*

*Fig. 6. One of the very few existing off-screen photographs from the thirties of a live received transmission. This high contrast picture of Betty Bolton was a long exposure directly from the mirror-drum display onto a photographic plate. The picture on the right shows Betty to be more attractive than the photo indicates.*

features. Exploiting the relationship of imagery across lines and across frames improved the performance of noise suppression and timebase correction, **Fig. 10**.

The timebase errors were different from those of 'Phonovision', relating purely to the domestic-quality recording equipment. The errors were partly corrected by a custom algorithm[12] based on a technique developed for military target tracking. This approach corrected for gross fluctuations in playback speed at up to the frame rate.

Higher speed changes proved difficult with the high surface noise, dropouts and clicks confusing the line-to-line correlation. However, the noise suppression software required the timebase to be corrected first.

Without synchronising pulses to peg the picture in place, small speed changes had a large effect on the displayed image. Simply making the disc play-back slightly off-centre by, say 0.5mm, caused the image near the end of the disc to roll roughly three times one way, then three the other way on every revolution of the disc.

Fortunately, the heavily corroded disc had been professionally transcribed with great care, minimising such effects. Even so, fast speed changes during recording, caused pos-

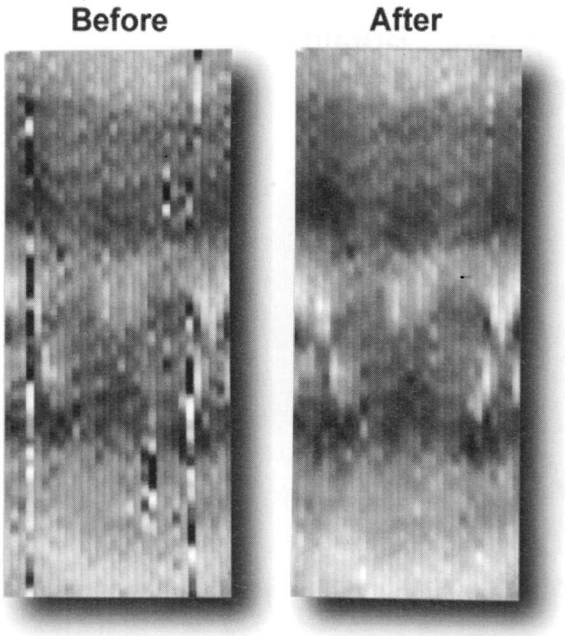

*Fig. 8. With the hand-written message "Television 1933" on the disc label as the only clue, the restored material yields the world's first television revue.*

*Fig. 7. Pictures such as this are misleading. It is a fabrication – a long-exposure photograph looking through the apertures of a scanning disc at the scene beyond. 30-line television was designed for movement though – not stills.*

## The Silvatone recorder

In the early thirties, there were several competing brands of home-audio disc recorders. In 1930, £4 12s – roughly £100 at today's prices – would buy you a 'CairnMor' for 'Silvatone' discs. Made by Cairns and Morrison Ltd of London, the machine, **Fig. 9**, recorded sounds from a microphone onto a seven-inch aluminium blank disc at 78rev/min using your existing gramophone.

The price included six blanks, which could be recorded only once. When the recording was played back, you had to use a special soft stylus (fibre) to allow the disc to be replayed more than once. The quality of the recordings was worse than that of a 'dictaphone' today.




## Drop-out & Noise Reduction

*Fig. 10. Digital image processing suppressed the damage of over sixty years on soft aluminium. The sophisticated noise filter tracked movement and adapted to how 'busy' the scene was. The domestic recording technology was exceptionally crude, in itself causing a major part of the distortion.*

sibly by uneven drag on the cutter ploughing through the aluminium blank, still created problems that needed correcting.

With over 2700 tv frames, the restored disc dwarfed the 700-odd tv frames of each of the five earlier 'Phonovision' discs.[13] The restoration required a new software suite geared to the unique distortion of this disc. Some errors remain and affect the cosmetic appearance of the images. However, it is unlikely that further processing will reveal more information. ■

**Donald's next article details the earliest known recording of broadcast television**

### References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5. McLean D F, 'Restoring Baird's Image', *Electronics World*, October 1998
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