

## Television is 90

Malcolm Baird looks back on 90 years of UK television since the first public demonstration by his father on 26 January 1926.

### Beginnings

At the beginning of the 20<sup>th</sup> century, television was no more than a fantastic idea foreseen by H.G.Wells in his novel *The Sleeper Wakes*. In 1908 the Scottish physicist Alan Campbell Swinton (1863-1930) suggested that “distant electric vision” might be achieved using the cathode ray tube which had recently been discovered. He never tried to develop his idea practically and in 1924 he declared that it would be so much trouble to do so that it would “hardly be worthwhile”. In that same year, small news items began to appear in the popular press concerning television experiments, first in Hastings and later in London, by a young Scottish electrical engineer called John Logie Baird. The image of the subject was scanned mechanically by a rapidly rotating wheel containing a spiral arrangement of perforations (Nipkow disc). The light fluctuations were picked up by a photocell and converted to weak fluctuations in voltage, which were greatly amplified before being sent out by wire to the receiver. At the receiving end, the signal was amplified further and converted to light by a neon lamp located behind another Nipkow disc, synchronized to the same speed as the camera disc.

Baird gave a public show in Selfridges department store in March 1925, and soon afterwards a demonstration at a press luncheon sponsored by his old friend, the theatrical and film star Jack Buchanan (1890-1957); but these were not true television in the sense that the picture had no half-tones. It appeared merely as areas of black and white, so the human face looked like a moving mask. The breakthrough did not come until 2 October 1925 when Baird succeeded in producing a television picture with gradations of light and shade.

### First Demonstration

Up to this time, news about Baird’s research had mainly taken the form of little items in the popular press through which he hoped to attract investors in his new company, Television Limited. Few technical details were published and the scientific establishment was cautious about television, since Baird was a private entrepreneur. His degree from Glasgow’s Royal Technical College lacked the cachet of Oxbridge or London University.

Baird and his business associate Oliver Hutchinson (1891-1944) realised the need for respectability and



Televised image of Hutchinson 1926

credibility. They decided that the first public demonstration of true television should be given to invited members of the Royal Institution and reported only in *The Times* newspaper, which was considered to be more respectable than the popular (tabloid) newspapers. On the evening of 26 January 1926 a gathering of distinguished scientists, some in evening attire, waited on a narrow staircase for their turn to be ushered into Baird's attic laboratory at 22 Frith Street in Soho, London's night club district. The party included a reporter from *The Times*, in which a cautiously favourable report appeared two days later.

Visitors were admitted to Baird's small laboratory a few at a time. They first saw the image of the ventriloquist's dummy (named by Baird as Stookie Bill) and then took turns to be "televised" in the intense floodlighting. Baird describes the scene in his memoirs:

*In one room was a large whirling disc, a most dangerous device, had they known it, liable to burst at any minute with showers of broken glass... One of the visitors who was being transmitted had a long white beard, part of which blew into the wheel. Fortunately he escaped with the loss of a certain amount of hair. He was a thorough sportsman and took the accident in good part and insisted on continuing the experiment and having his face transmitted.*

The thorough sportsman with the long beard was probably the radio pioneer Sir Oliver Lodge (1851-1940), who was very interested in Baird's experiments.

### **Enter Electronic Television**

Historians usually take 26 January 1926 as the birthday of television, with the important qualification that it was mechanical television, as opposed to electronic television which came on the scene several years later. The precise birthday of electronic television is still subject to debate between opposing camps supporting the two American pioneers Philo Farnsworth (1906-1971) and Vladimir Zworykin (1888-1982). Zworykin's electronic television patents, dating from 1923, were held by his employer Westinghouse, with later patents held by the Radio Corporation of America (RCA). In 1939 after many years of litigation, RCA acquired the rights to the key Farnsworth patent.

In 1928 the potential of television had been dramatically demonstrated by the mechanical technique, when Baird sent pictures from London to New York via short wave radio (40 m, 7.5 MHz). In 1929 the BBC, after considerable prodding by Baird and his supporter Sydney Moseley (1889-1961), had started to broadcast television experimentally using a 30-line mechanical system. Signals could be received all over Britain on medium wave (356 m, 0.84 MHz) using an ordinary domestic radio receiver with an attached electromechanical device (the Televisor) that enabled a picture to be viewed. The image was small, typically about 3×5 cm. An individual performer or speaker came through quite recognisably but the technology was stretched to its limit when a play "The Man with a Flower in his Mouth", with a cast of 3, was broadcast. Nevertheless this was seen as an historic event.

By 1933, Baird was coming to realize where the future lay and he began to do research on electronic television. Meanwhile the company that he had founded, now called Baird Television

Ltd., had been taken over by Gaumont British Pictures who were particularly interested in showing large screen television in their network of cinemas. Baird's research moved to large screen and colour television produced by electronic means.

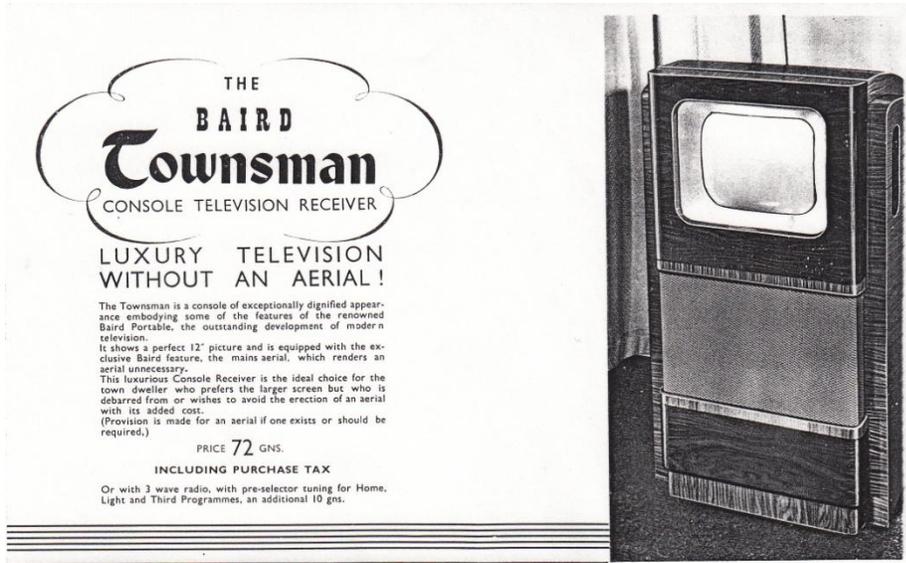
### **The Competition of 1936**

In 1934, a merged company called Marconi-EMI was set up to develop a "British" electronic television system, largely based on the patented work of Zworykin and his group at RCA. Much has been written about the BBC's technical trials of high definition television in which Baird Television and Marconi-EMI transmitted to viewers in the London area on alternate evenings. The trials started on 2 November 1936 at Alexandra Palace. A new book about the BBC trials, by the media historian Jamie Medhurst, is expected this year (2016).

Marconi-EMI provided a 405-line picture and it proved to have the edge over the 240-line Baird Television picture. The main advantage of the electronic technology lay in the relatively small and mobile cameras which allowed much better working conditions in the studio, compared to the more cumbersome Baird cameras. The Baird company used three different systems in the trials. The first was a "flying spot" mechanical scanning method using a large Nipkow disc. The second system was the "intermediate film" which involved the making of a film of the programme followed by very rapid development of the film and the scanning of the film by a telecine device to produce a television signal. Finally, an improved version of the Farnsworth electronic camera was used under licence. Early in 1937 it was decided that the BBC would adopt the Marconi-EMI-RCA cameras and related technology; despite this setback, Baird Television Ltd. stayed in business as a major manufacturer of 405-line television receivers.

### **A Plaything for the Rich**

In 1937 the price of a small television set, about £60, was several months' earnings for the average British worker. Only a few wealthy households could afford television and the reception on 6.7 m wavelength (45 MHz frequency) was limited to a 50-mile radius of London. Two years later, the start of World War II forced the BBC to close down its television service abruptly in the interests of national security. The market for television sets disappeared and Baird Television went into receivership. However, J.L. Baird decided to continue his research using his personal savings of £15,000, a substantial sum for those days. Between 1939 and 1944 he produced results which, but for the war, would have had an immediate effect on the industry. These included high definition colour television, demonstrated in December 1940. Later he demonstrated a high definition 3D system and an all-electronic colour receiving tube known as the Telechrome, the first of its kind in the world. But he had never enjoyed good health and in early 1946 he became seriously ill. He died in June of that year at the age of 57.



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**Baird receiver of 1949.**

**It was considered top of the line, with a 12 inch (30 cm) screen. It was priced at 72 gns (£75.60), about £1000 in today's money.**

The immediate postwar period in the UK was a time of rationing and shortages. Television was given a low priority and it was considered a luxury for the privileged few who could afford it. Television sets carried a sales tax of 67% and the BBC programmes only went out for a few hours per day. Television was still very much overshadowed by radio ("the wireless") which went through a golden age with its comedy shows, thrillers, concerts, news and sports programmes. Between 1945 and 1955 radio had audiences in the millions and it provided a much-needed relief from the austerity and high taxation that continued in the UK for many years after World War II.

### **Television for All**

It was only in the late 1950s that television viewing numbers began to grow rapidly. The BBC had been opening regional television stations outside London, but the strongest triggers for growth were the televising of the Coronation in 1953 and the falling cost of television for the home viewer. This was thanks to the television rental companies, through which a television set could be rented for a few shillings a week; the rental fee included repair or replacement costs when the sets broke down, a common occurrence in the early days.

There was a strong feeling among television set manufacturers and some Conservative MPs that BBC television was in need of competition. A leader in this campaign was Charles Orr Stanley (1899-1989), the outspoken head of Pye of Cambridge. In 1954 a new Television Act was passed, permitting independent (i.e. commercial) television stations and thereby breaking the BBC's monopoly. This was opposed by educational and church leaders and, of course, by the BBC itself. In a speech to the House of Lords, the BBC's founding director general (Lord Reith, 1889-1971) likened independent television to the bubonic plague. On the other hand, fortunes were made by the new independent television companies. For example, the Canadian magnate Roy Thomson (later Lord Thomson) famously described a television station licence as a "permit to print money". J.L. Baird had recommended independent television in 1944 in his evidence to a government committee on the future of television. There is little doubt that had he lived, he would have been one of the strongest supporters of independent television.

Television gradually overtook radio as an electronic medium and it also had a disastrous effect on the UK film industry. Formerly every small town had one or two cinemas, but these gradually went out of existence. The film industry tried to retaliate by concentrating on its production advantages such as large screens and colour and the ability to show extravagant "spectaculars". For a short time, 3D films were made, but these required the audience to wear special glasses and they did not catch the public fancy. Last but not least, the print media were affected by television. Many illustrated magazines closed and so did some newspapers, as people's leisure time was gradually taken up with "televieing".

### **Changing Technology**

The opening of the BBC's high definition television service in 1936 had been the outcome of several years of intensive research and development in the USA and Britain; but in Britain there was a slowdown in technical progress soon after 1936. The prime reason for this was anticipation of World War II, which completely stopped British television between 1939 and 1946. Technical people with expertise in television were diverted into other fields such as radar.

After the resumption of BBC television in 1946, the old cameras and receivers were brought out of mothballs and restarted on the Marconi-EMI-RCA system of 1936. This offered a small black and white picture, rather vulnerable to interference from car ignitions, electric shavers, etc. For many years there was no means of obtaining quality recordings, other than film, which would have required a separate camera in the studio, or a system called tele-recording, which produced poor results. The BBC was not keen to use film which it tended to regard as a competing medium.

Transmitter range was also a problem. It was gradually solved within the UK by setting up regional stations which relayed the London programmes as well as producing a few local shows. Television opened in Scotland in 1952 and I vividly recall the upbeat atmosphere at the official opening of the BBC's Edinburgh studio. Two years earlier it had been hailed as a great achievement when a special microwave relay was set up across the English channel, enabling television to be sent from Calais for direct viewing in London. But in 1953 it was still not possible for the televised Coronation to be seen directly in North America, so a hastily-processed film of the event had to be flown across the Atlantic on one of RAF's fastest planes. It was not

until 1962 that the development of communications satellites enabled television to be sent across the Atlantic. Although J.L. Baird had sent his 30 line pictures across the Atlantic in 1928, this was only possible because he could use short (40 m, 7.5 MHz) waves which had a very long range, thanks to ionospheric reflection. Unfortunately there are fundamental scientific reasons why high definition television cannot be transmitted on long-range wavelengths.

As the popularity of television grew in the UK, the technology gradually improved. High quality video tape recording of programmes started after about 1960 and the picture definition was increased from 405 to 625 lines in 1964. At last colour was introduced in 1967, about ten years after its arrival in the USA. One of the most important underlying advances was the replacement of valves (tubes) by solid state devices, followed much later by the replacement of cathode ray tubes by flat screens (LED). It is easy to forget that the older generation of electronic television sets were heavy and bulky and prone to overheating. Breakdowns were common and every British town had its television repair businesses.

The introductions of satellite and cable have eliminated the problems of interference and bandwidth that bedevilled early broadcast television. There has been a huge increase in the number of available channels. Television recordings (first on VHS tape and now on DVD) can be bought for a few pounds and played at any time. Last but not least, viewing on demand (VOD) has released viewers from the constraints of programme scheduling. Today, television is in 99 per cent of British households and the cost of a set is a few days' average earnings, in contrast to several months' earnings in the 1930s.

### Television Manufacturing moves East



**Baird colour television plant in Bradford, c. 1968**

As recently as 1970, thousands of British workers were employed in the design and production of television sets. At the professional level the Television Society, formed in 1927 with J.L. Baird as its first honorary fellow, consisted of scientists and engineers with a smattering of journalists. This all changed as television set production gradually declined in the western hemisphere. Arguably, the last major British factory to close (1978) was the Baird plant in Bradford. This had been operated by Radio Rentals and later Thorn Electric Ltd. who used the Baird name for its brand of television sets.

In the past 40 years, the term “television industry” has come to refer mainly to programming and distribution, rather than the technology or the manufacture of equipment. This change has been faithfully reflected by the Royal Television Society which gained its royal status

in 1966 and soon afterwards began to cater mainly for television managers and programme makers.

Science and engineering may seem to have been eased off centre stage in television publicity; but the technology continues its inexorable advance. The small 30-line monochrome pictures of 1925 and the 12 inch (30 cm) monochrome cathode ray tube pictures of the 1950s have now been replaced by a razor-sharp colour picture on a large flat screen (typically 42 inch or 1.07 m) that can be hung on a wall, taking up less space and using less power than a cathode ray tube set. Definition is no longer only defined in terms of lines but also in terms of digital pixels. On the sound side, stereophony has become the norm. Stereoscopic television (volumetric imaging, not needing special glasses) has yet to reach the consumer but it is in use in industrial design and medical applications.

### **Programming**

A few years ago the American PBS network announced a documentary series entitled *Pioneers of Television*. I eagerly tuned into it in the hope of getting a new insight on the Farnsworth versus Zworykin debate. But I was disappointed to find out that the PBS coverage was about non-technical people, entertainers such as Sid Caesar, Shelley Berman, the Smothers Brothers and Joan Rivers. Just as the term “television industry” has changed its meaning, so has the term “television history”. In both cases the focus has shifted away from technology and towards the making of programmes.

The historian of television programming faces a challenge in that there are no good quality video recordings of programmes made before about 1960, in the UK anyway. On the other hand, many of the post-1960 taped programmes have become available to the general public on DVDs or through YouTube. Among the most popular programmes of the 1960s are the comedy series *Hancock's Half Hour* and the fantasy-thriller series *The Avengers* and *The Prisoner*.

The 1960s saw a new and instantly successful television genre: satire shows, which made the reputations of people like Alan Bennett and David (later Lord) Frost. But on watching the shows again after 50 years I find them disappointing, partly due to their primitive technical quality and partly because the objects of satire are only dimly remembered. On a more serious level, in 1962 the BBC produced a specially written play by Terence Rattigan (1911-1977) entitled *Heart to Heart* in which television takes a hard look at itself. The play is important because it raised issues that are still topical, such as the stressful effects of media exposure on television personalities and others in the industry. Recently the play was reissued as part of a DVD boxed set entitled *The Terence Rattigan Collection*.

***Heart to Heart* starred Sir Ralph Richardson and Kenneth More and it featured on the front cover of the *Radio Times***



The period between about 1970 and 1990 has sometimes been called the Golden Age of Television. By 1970, technology had advanced so that picture quality was good and picture size was increased by improved cathode ray tube design. Television was a much better medium than film for adaptations of literary classics because in the latter case the original classic had to be cut drastically in order to fit it into the normal film length of about 2 hours. On the other hand, television dramas were usually serialized and the number of episodes could be adjusted to give full coverage of the original books. Among the most acclaimed productions of this time were *Tinker, Tailor, Soldier, Spy* (BBC, 1979), *Brideshead Revisited* (Granada, 1981) and the P.G. Wodehouse stories in the long-running series *Jeeves and Wooster* (Granada, 1990-93). These dramas found their way to large and enthusiastic audiences in the USA through public service television (the PBS network).

### **More Technology**

By the end of the 20<sup>th</sup> century, television circuitry consisted mainly of solid-state devices which were compact and durable and did not consume much power. The only exception was the cathode ray tube (CRT). For safety reasons it was made of thick leaded glass and its presence was painfully obvious whenever a television set had to be moved from one place to another. From about 2005 onwards, the CRTs were replaced by flat screens using technologies such as plasma, liquid crystal displays (LCD) and light emitting diodes (LED). Another important technical development has been the role of television in computing. Cathode ray tubes were used in the monitor screens (text only) that were part of the first desktop computers in the 1970s. A few years later, computer technology had progressed to the point that film or television clips could be stored and shown on the monitor screens and the distinction between a computer and a television set began to blur. As in the case of television, CRT-based computer monitors have been replaced by flat screen monitors with a great saving of precious desk space.

The combination of digital technology and transmission by satellite and cable has redefined the traditional problem of “bandwidth” that bedevilled television in earlier years. A high definition (i.e. high frequency) signal required a bandwidth that exclusively occupied a slice of the broadcast frequency spectrum. For that reason, conventional television could only be transmitted on a few “channels” in any given locality. That restriction has disappeared and we now live in “the multi- channel universe” in which the captive mass audiences of the early days have been fragmented among dozens of available viewing channels.

### **More programming: from Baird to Worse**

As far as technology is concerned, there is no doubt that J.L.Baird and the other pioneers would have been awestruck by modern television. But sadly, the average programme quality has not improved to the same extent as technology. Although there are a few nuggets among the dross, there is a long history of dissatisfaction with television programmes.

Dr.Samuel Johnson once said, in reference to a dog walking on its hind legs, that “the wonder is not that ‘tis done well, but that ‘tis done at all”. This was also the public reaction to the very first television pictures in 1926 which consisted simply of a human face turning and grimacing. The sense of wonder at the new medium still existed in the UK in the late 1940s when it was not uncommon to see a small crowd gathered outside a shop window in which a television set was showing a programme.

Soon after the television emerged as a mass medium, criticisms started. In an historic interview in 1967, Malcolm Muggeridge asked the BBC’s first Director General, Lord Reith, what he thought of the medium; he replied that it was “a potential social menace of the first magnitude”. In the United States at about this time, the legendary television pioneer Philo Farnsworth angrily refused to have a set in his house. The film director Orson Welles confessed: “I hate television. I hate it as much as I hate peanuts. But I can't stop eating peanuts.” January 1976 marked the 50<sup>th</sup> anniversary of Baird’s first demonstration and the humourist Frank Muir, in a letter to *The Times* , asked slyly whether television had gone from Baird to worse.

Sometimes I am asked what my father might have thought of modern television with its explicit sex, gratuitous violence and mind-numbing inanity. J.L.Baird was raised in a respectable Victorian family, but in his student days he had seen the seamier side of life as a Glasgow dockyard apprentice and he had endured extreme poverty in London in the early 1920s. If he were to see some of the modern programmes he might have let fly with a few choice dockyard oaths. My mother, shortly before her death in 1996, was asked by a journalist for her opinion of modern television programmes. She was usually plain-spoken, but on this occasion she damned the medium with faint praise: “Well, I suppose television must be a good thing as it provides employment for so many people.”

The indifferent quality of most television programming is easily explained. Television stations today operate on something approaching a 168-hour weekly schedule and they simply do not have the human or financial resources to support expensive or high quality programmes for more than a small fraction of the time. Programme makers face the challenge to produce something (anything) which will attract a large audience at low cost. The problem is made worse by the

proliferation of channels and the fragmentation of the audience numbers, with obvious effects on advertising revenue for each commercial station. As a result of all this, viewers face a menu of repeats, talent shows without much talent, reality shows without much reality, and sketchy documentaries which feature jokey presenters glossing over the factual inaccuracies. J.L.Baird himself has been a victim of low quality documentaries.

Overlying audience fragmentation, there is a gradual move away from scheduled broadcasting to a group of passive viewers towards an interactive system in which the viewer decides on what he (she) would like to watch and when to watch it. The growth of the internet is steadily eroding the average weekly television viewing hours per person and this trend is strongest for the more educated and affluent sectors of the population. Britain's BBC, formerly a rather complacent organisation with an assured income from licence fees, has been affected by the general mood of uncertainty and malaise. There is a groundswell of public discontent about its top people and their six figure salaries. This has been worsened by scandals and legal cases involving some of the BBC's television personalities. Its charter is currently under review.

### **The next 90 years**

There is no longer any truth in Roy Thomson's 60-year-old saying that a television broadcasting licence is a permit to print money. Based on current trends one might even be led to think that broadcast television is a sunset industry about to be overtaken by the internet. Although this would be an eye-catching newspaper headline, history shows that other electronic media which were formerly under threat, have adapted and survived. For example, as television grew in popularity, radio suffered a major setback but it did not disappear as a medium. It no longer broadcasts nearly as many dramas, live concerts or documentaries, but it remains an important source of current information such as news, weather and financial markets. It is still possible for people with the gift of the gab to make a good living with their talk and record shows that fill the gaps between news and weather reports.

The film industry is an interesting example of media adaptation and survival. Historically speaking, as its name implies, film was not originally an electronic medium. It was severely damaged by television in the 1950s but it has managed to hold its position in the media spectrum. As it becomes financially more difficult to produce drama for broadcast television, the film industry is standing ready to replace it. New technology, such as the DVD and video on demand, can show repeat films on the home television screen. These formats can easily incorporate multi-part serial productions.

Although broadcast television will no longer monopolize the home screen, it will not entirely disappear because it has the unique ability to capture major current events and sporting events, as they happen (in real time). In this it is helped by new technology in the form of small (hand held) and robust cameras and improved satellite and internet links. However, broadcast television is vulnerable to competition in areas that do not depend on immediacy, such as drama, music and documentaries.

J.L.Baird predicted that television could be a force for world peace by allowing people to see directly how life is lived in other countries. In his words, "television is tomorrow's diplomat".

The internet (Facebook, Skype, etc.) can advance this process to the stage where anyone in the world can communicate with anyone else directly and personally, both in sound and in vision. The original motto of the BBC, approved by Reith in the 1920s, might even be updated to read “Nation shall Tweet Peace unto Nation”. Technology is always driving towards new applications as well as making existing applications more efficient and cheaper . This suggests that in the foreseeable future, everyone will have an inexpensive means of keeping in touch visually with the world, both on a broad basis (news) and on an individual basis (networking). The pitfall of this ideal is that a large fraction of these communications will be in the form of unwanted solicitations or advertising (spam). New anti-spam technology is continually being developed.

Any attempt to predict the future of television must include social and political change and that is a tall order. Television has had a profound effect on politics, as shown in *Heart to Heart*. Equally, politics has affected television. The old formal pattern of government regulations and licensing procedures was developed for centralized broadcasters but it is hard to see how it could apply to person-to-person audio and video communications. It is more likely that such communications will be subject to government surveillance in the public interest (security, political correctness etc.). Another possibility is that jamming will be used to create “dead zones” where no electronic communicators can operate. One hopes that this would also be in the public interest. Very little has been said openly about jamming, but it is an old military technology that dates back a century and we may be hearing more about it soon.

Television will continue to evolve in directions never foreseen by J.L.Baird and the other pioneers or by the well-paid leaders of today’s industry. Technical change continues to be the driving force and the next 90 years of television promise to be as eventful as its first 90 years.

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NOTES: this article contains some material from earlier articles by Malcolm Baird in *The Guardian* on 21 Nov.2001, *FOLIO* (National Library of Scotland), winter 2006, and the *British Vintage Wireless Society Bulletin*, Spring 2012. Malcolm Baird would like to thank Iain Baird for his help in preparing this article.