Industrial Archaeology Review (The Association for Industrial Archaeology)

In celebration of the K8 Telephone Kiosk – Britain's last red, cast-iron phonebox

Authors:
Nigel Linge[1], Andy Sutton[1], Andrew Hurley[2] and Neil Johannessen[3]

1. School of Science, Engineering and Environment, University of Salford
2. Trustee, National Collection of Telephone Kiosks, Avoncroft Museum
3. Retired, former Director, BT Museum

Abstract

Whilst every country in the world has introduced phoneboxes onto its streets, the UK stands alone in having adopted the red phonebox as a symbol of its national identity. However, that symbol is of phonebox designs produced by Giles Gilbert Scott in 1925/35 and not of the more contemporary ones that followed it. When introduced in 1968, the Bruce Martin designed K8 kiosk or phonebox, was hailed as a masterpiece of industrial design yet, today it has virtually disappeared and been forgotten. It was the last of the British red, cast-iron phoneboxes and despite over 11,000 being manufactured, less than one percent survive. This paper traces the evolution of the British phonebox, focusing on the circumstances that led to the development of the K8 and describes in detail its design. Particular attention is then given to the post-privatisation period when British Telecom embarked on a phonebox modernisation programme that sought to replace all of its old red phoneboxes. Important lessons for industrial archaeology can be learned from this period for whilst attention was directed towards saving the Giles Gilbert Scott designs, the newer K8 was ignored and consequently subjected to wholesale removal. As threats emerged, they were neither recognised nor combatted and the formal mechanisms for preservation weren't fit for purpose. Telecommunications is a rapidly changing field that brings enormous challenges for the heritage movement, as the K8 story illustrates, requiring a far more agile approach in respect of contemporary collecting policies and improved procedures for protection and preservation. As part of industrial archaeology, the British phonebox is important both in terms of its contribution to design and its impact on society. Within that context this paper considers in detail a forgotten aspect of phonebox evolution, namely that of the K8 kiosk and includes a detailed listing of those K8s which are known to have survived.

Author Biographies

Nigel Linge is Professor of Telecommunications at the University of Salford. An electronic engineer by profession, Nigel specialises in data communication networks and their applications but also takes a keen interest in telecommunications heritage. He regularly delivers lectures and writes papers on the history of telecommunications and has co-authored two books, "Thirty years of mobile phones in the UK" and "The British Phonebox". Nigel is also chairman of the editorial panel for the Journal of the Institute of Telecommunications Professionals and writes a regular column

describing events in telecommunications history. His media appearances include the BBC 4 Timeshift documentary, "Dial B for Britain". Nigel also works closely with Connected Earth partnership which is a heritage network of UK based museums and organisations that collectively promote telecommunications heritage.

Andy Sutton is a telecommunications network architect and design engineer with over 30 years of experience. He holds an MSc in Mobile Communications from the University of Salford. Andy is currently working on the design of advanced mobile and wireless communications networks however his interests span the past, present and future of telecommunications. Andy is a member of the AIA and keen student of telecommunications history, he's co-author of four books, two of which focus on telecommunications history and heritage; 30 Years of Mobile Phones in the UK and The British Phonebox, both published by Amberley Publishing. Andy is a Chartered Engineer and Fellow of the Institution of Engineering and Technology and The Institute of Telecommunications Professionals. Andy is a Visiting Professor with the School of Science, Engineering and Environment at the University of Salford and with the Department of Electrical Engineering and Electronics at the University of Liverpool.

Andrew Hurley has been a lifelong employee of BT and its predecessor, the GPO. He started as a Youth in Training and retired as the District General Manager of Severnside. Technical employment included Repeater Station maintenance and small power systems. There were short breaks to complete National Service with the Royal Signals and to gain an Honours degree in Electrical Engineering. Management included exchange planning, installation and maintenance, and he progressed from Deputy General Manager Cardiff, to General Manager Gloucester, and finally District General Manager. Following retirement, he became the project manager for the creation of The National Collection Telephone Kiosks held at Avoncroft Museum and now acts as the Collection coordinator for that collection. Acknowledged for his expertise on phoneboxes, Andrew supports a wide range of researchers and makes regular contributions to the media and featured in the BBC 4 Timeshift documentary, "Dial B for Britain".

Neil Johannessen was, prior to retirement, the Director of BT's Museum in London and Curator of BT's heritage collection. A physicist by background, he first became interested in industrial archaeology in his teens, notably in the area of canal restoration. His knowledge of phoneboxes arose out of necessity from his position within BT and resulted in him authoring the book, "Telephone Boxes" (Shire Library). Neil is a recognised authority on telecommunications heritage and regularly provides advice and guidance to heritage organisations and groups.

Correspondence Address

Professor Nigel Linge, School of Computing, Science and Engineering, Newton Building, University of Salford, Salford M5 4WT, UK.

Email: n.linge@salford.ac.uk

Key words

Telephone kiosk, phonebox, telecommunications heritage, Bruce Martin, K8

1. Introduction

Every country throughout the world has introduced phoneboxes onto their streets to allow public access to the telephone. However, the UK seems to stand alone in its adoption of the phonebox as an iconic symbol of its own identity. For example, the image conjured up of the archetypal English village comprises a duck pond, a pub, a church and a red phonebox! This is, despite the fact that phonebox usage has declined massively in recent years, with the younger generation probably having never set foot inside one.

Additionally, the red phonebox that has come to symbolise the UK is actually one of Giles Gilbert Scott's designs dating from 1925/35 and not one of the later, more contemporary, versions that replaced them. One of those later phoneboxes, created by Bruce Martin, was launched in 1968 and at the time was hailed as a masterpiece of industrial design. Yet, in comparison to the much earlier Gilbert Scott designs, it is today largely forgotten with very few examples remaining in-situ from the 11,000 that were manufactured. The K8 telephone kiosk as it became known, turned out to be Britain's last cast-iron, red phonebox and one that would for ever be overshadowed by designs that preceded it by 30 years. In many ways its modernity became its downfall.

From an industrial archaeology point of view, the phonebox viewed as a miniature building, should be regarded as an important piece of our landscape and urban environment.[1] That in turn warrants its preservation and protection. However, as this paper will show, the story of the K8 kiosk highlights how fickle our perception of what needs to be protected can be and how the pace of change and the needs of today's privatised telecommunication companies brings huge challenges for the heritage movement, which in turn puts at risk an important aspect of our modern history.

2. Development of the phonebox in Britain

In 1912, the British Post Office - a department of the Government's Civil Service - was given almost complete control over Britain's growing telephone services and networks, when the assets of the private enterprise National Telephone Company (NTC) were nationalised. The NTC was exclusively a provider of local telephone exchanges and service and operated by far the lion's share of Britain's customer lines. The Post Office, for their part, operated all of Britain's long-distance telephone network, a growing number of international connections and, also had their own – albeit smaller – network of local exchanges and customer lines.

The Post Office immediately busied itself with merging the staffing structures, charging and billing systems, stores and supplies of the NTC with its own operations. Public telephone kiosks were naturally also in the mix.

Originally known as public call offices or silence cabinets, the provision of telephone kiosks was enabled by the Postmaster General, Henry Fawcett, in 1884. Telephone companies were permitted to place telephones in public spaces and for the payment of a few pennies, offer access to their service to non-subscribers. The first examples began to appear in the mid to late 1880s and by 1907, the NTC was operating 7800 public call offices. Almost all were simple wooden booths, indoors or under cover, typically located in railway stations, business exchanges, hotels and shops, but only a very small number of them were strictly, street kiosks. They were a somewhat mixed bag of design and constructions and, like everything else NTC, in 1912 they passed across into the Post Office's newly expanded telephone business.

The Post Office began work on a new standardised design of kiosk, a task which like many others was destined not to be concluded until after the 1914-18 War was over. The result, introduced in 1921, was given the bureaucratically inevitable stores title Kiosk No.1, and as shown in Figure 1, took the form of a simple pre-cast sectional concrete kiosk, with a wooden door.

Like most telephone cabinets and kiosks before it and since, the new K1 had a square footprint of about 3ft x 3ft (900mm x 900mm) and was tall enough for a normal adult to stand up in. It had half-height glazing in the door and two sides, ventilation, and was topped by a smooth pyramidal roof and orb finial. The Post Office was proud of it, but this was not the universal view. Indeed, as the next few years passed, and as more units were erected, the Post Office was often made well aware that their political masters and local councillors had very strong views on just what was, and was going to be, allowed onto their streets.[2]

By the middle of the 1920s, developments in automatic exchange design and line transmission had made growth of the telephone service a real economic (and political) possibility and - now with enthusiastic advertising and public relations designed to ‘grow the telephone habit’ - the Post Office was tasked with expanding the existing network and extending it into hitherto unserved rural areas. It soon became very clear that the Kiosk No.1 really was not what was needed.

For the Metropolitan Boroughs of London (in effect the central Boroughs, but including some less central ones, such as Bromley and Hackney) the K1 was nowhere near good enough, and the Post Office met almost total opposition from them. By March 1924, the number of street kiosks across the country had reached a little over 600. In London, there were still just 16, and to overcome the

resistance to the K1, the Post Office commissioned a new design, just for London - the Kiosk No.2, which started to appear on the streets in late 1924/25. Chosen in a public design competition, and the work of a noted architect Giles Gilbert Scott, this new cast-iron K2 was painted bright red and was much bigger in all respects than the K1 but, whereas the Boroughs had refused point blank to allow the K1 onto their already cluttered streets, they were quite happy to find room for the K2. Hence, the number of kiosks in London grew quickly which meant that by the end of 1925 there were over 200. This number had risen further to almost 400 by the end of 1926 and by the end of 1927, had doubled yet again to almost 800. Over the next few years, something around 1500 kiosks went on to be erected.

By any measure, the K2 which is shown in Figure 2, had succeeded in 'breaking' London, in a way that the K1 had spectacularly failed to do. But with that came a significant problem. Local authorities across the country similarly expressed a desire to receive K2s but not only was the K2 bigger and more difficult to find room for, it was also hugely more expensive to provide than the simple K1. There was just no way that the Post Office, or more accurately, the Treasury, was going to let more than the occasional K2 escape from London, and most certainly not in the quantity that they expected to be installing over the next few years. So, the Post Office did two things. Firstly, they commissioned a K2-style concrete kiosk - the K3, also styled by Gilbert Scott, and introduced in 1928. Very much cheaper per unit than the K2, and with external dimensions much the same as the K1, the K3 became the Post Office's first choice for everywhere other than Metropolitan London. With a standardised colour scheme of cream with red glazing frames, the K3 went on to appear across the nation, from towns and cities to the smallest of rural communities, as shown in Figure 3.

Secondly, the Post Office gave the K1 a facelift, with the new model having full-height glazing frames not unlike those of the K2 and K3. This new K1 variant was by far the least expensive of the stock kiosk range and was therefore deployed where the more expensive options could not be justified.[3]

Over the next 6 years or so, the K3 and the updated K1 accounted for by far the majority of installations and, by the middle of the 1930s, they accounted for something over 17000 new sites.[4]

Perhaps not surprisingly, this scale of production required much more effort and management time than did the earlier K1 model, and with that came recognition that cast-iron was a better material for the purpose than was sectional pre-cast reinforced concrete. Naturally, they both needed regular painting, and both tended to perform badly if hit hard enough by a vehicle, but the main difficulty that the Post Office had with concrete was at the supply end of the chain. Their needs for cast-iron products, such a kiosks and letter boxes, could be met by just a handful of easily monitored

and trusted foundries. However, as the numbers of kiosks ordered continued to increase, they found it harder and harder to ensure the quality of the delivered concrete units and, facing the probability of even higher rates of installation, the Post Office began to consider a single one-size-fits-all cast-iron telephone kiosk, for use anywhere and everywhere. For this they returned to Gilbert Scott, and the result was the 1935/36 Kiosk No.6 shown in Figure 4, for both new sites and to replace existing concrete units.[5]

With the launch of the K6, production of all previous models ceased and, from a standing start in 1936, by the end of the decade there were something around 20000 K6s in cities, towns, villages and hamlets across the nation.[6]

In 1939, the K6 Mk2 was introduced. It looked much the same but, whereas the Mk1 had screw-fixed glazing frames, in the Mk2 they were fixed in place with rivets. The Mk2 also had additional and stronger fixings for the payphone equipment and cash box. Kiosk vandalism and theft weren't exactly unknown in previous designs, but with the K6 appearing in ever more quiet and remote corners, and often without internal lighting, the temptations proved stronger and stronger.[7]

The War years and their immediate aftermath saw the numbers of kiosks being installed fall dramatically, but as the economic situation improved, and as the kiosk became an increasingly important way of extending the service at a reasonable cost, the numbers being supplied climbed again. In the 10 years between 1945 and 1965, a further 30000 or so K6 units were supplied but, despite this, not everyone was entirely happy with it.

Views on town and country planning had changed, and the classical lines of the K6 didn't now fit well with many of the newer architectural styles. It was also increasingly common to see groups of multiple kiosks, and the need for regular painting meant that such groups took up more space that if they had been erected hard against each other. The question of colour – which had been largely overridden before the War – also returned, with countryside preservation groups holding the view that red was not suitable for all locations. The Post Office continued to maintain that a standard colour was important for visitors to an area to be able to easily recognise kiosks. In the end, a second alternative colour scheme was agreed – battleship grey, with red glazing bars – for locations with special architectural or conservation merit; for example, in the Royal and National Parks, near cathedrals and in the quaintest of villages.

The fascia crown motifs also underwent some change, most obviously so on the death of King George VI in 1952. The kiosk crown detail was drawn from the Post Office crest, which was in turn derived from a silhouette of the crown of state used by the monarch. The new Queen chose to use a

different crown – the St. Edward's Crown – so, just as for every other Government Department, the Post Office had to redesign everything from its stationery to its vehicle liveries. Therefore, in 1953, K6s (and posting boxes) began to appear on the streets featuring a new crown detail.

But there was a problem. Her Majesty Queen Elizabeth II of England and Wales is Queen Elizabeth I in Scotland, and the Post Office had adopted a national logo that featured not only the St Edward's Crown but also the letters EIIR, and it was this motif that started to appear on posting boxes. It is fair to say that this didn't go down at all well in Scotland and therefore a different Post Office motif was soon designed for Scottish kiosks using just a silhouette of the Queen's Crown of Scotland. With two crown designs in use, K6 fascias manufactured after 1955 contained slots into which crowns of the correct type were inserted before the roof dome went on, ready for despatch from the foundry.[8]

As the 1950s turned into the 1960s – a period of major social, political, technological and economic change – once again, the Post Office began to consider whether or not its kiosk and payphone provision was fit for the future. And if it wasn't, then just what was to be done about it?

3. Motivations which led to the emergence of the K8

In the 1960s the Post Office's public telephone service was facing two challenges. On the one hand, vandalism and associated costs of repair had been a major and escalating issue for several years and on the other hand, it was felt the standard K6 kiosk was beginning to look dated in that it no longer reflected contemporary architecture, especially that of the modern town centre.

Cases of kiosk vandalism ranged from the wilful breaking of windows to the theft of money from coin boxes. The standard K6 kiosk for example, had 76 panes of glass of three different sizes and replacing any number of those was a labour-intensive job. Not only that but cleaning the individual pieces of glass made general maintenance both time-consuming and expensive. Damage to the telephone equipment and coin boxes not only incurred the costs of replacement but also it resulted in a shortage of spare parts, which in turn, led to outages in service that could last many days.

Speaking on separate occasions in Parliament, Postmaster-General Reginald Bevins and Assistant Postmaster-General Joseph Slater each reported on the total yearly costs incurred in repairing damage to kiosks and these are summarised in Table 1.[9]

Aside from the costs of maintaining and repairing kiosks, as the austerity of the post-war period made way for what became known as the swinging sixties, a growing thirst for modernity took hold

embodied in the concrete structures of the New Towns. Swept along with this was Gilbert Scott's K6 phonebox which was increasingly seen as being incompatible with this new exciting future.

Responding to these influences, in February 1965, the Deputy Director General of the Post Office issued a memorandum expressing the desire for a replacement phonebox design primarily intended for Local Government Areas that had modern town centres. It was also intended to meet the requirements for replacing existing kiosks that had reached the end of their useful life or that needed to be relocated due to civil engineering or other environmental works. Initial estimates suggested that 2000 such kiosks would be required for early installation in town centres and from the mid-1970s onwards, some 1000 to 2000 would be required per year as replacement stock.[10]

In fact, efforts had already been put in motion to redesign the phonebox six years earlier when in 1959, the Post Office approached architect Neville Conder.[11] Awarded the CBE for his design of the Ismaili Centre in Kensington, Neville Conder was a highly influential figure in post-war British architecture. The design he produced was distinctly modern for, compared to the K6, it had large windows, chamfered corners, a narrow concrete base which gave the impression that the whole kiosk was floating above the ground, and was manufactured in aluminium instead of cast-iron. Emerging as the K7 in 1962 and shown in Figure 5, six prototypes were put on trial in sites in London and Coventry.

Returning to 1965, the question facing the Post Office was therefore whether to put the Conder design into full production, or commission a totally new design. In March 1965, the Post Office Board decided to seek proposals for a new design.[12] Their reasons for abandoning the Conder design were firstly, that untreated aluminium quickly turned a streaky grey-black with white blisters, necessitating regular maintenance. Conder was well aware of this potential problem and had specified surface treatments to reduce the visual consequences. However, these were not implemented. Secondly, it was felt that the design made vandalism and theft more attractive because its central wide horizontal panel obstructed the view of the coin box. It was also suggested that the door handle could be broken off and used as a cosh. Thirdly, whilst it was desirable that kiosks should not be excessively obstructive it was nevertheless felt that the Conder design did not sufficiently stand out from its surroundings. Fourthly, mounting telephone equipment, directory holders and notices on corner pillars offered little flexibility in terms of the internal configuration.

Finally, the cost of the K7 was a factor too. The Gilbert Scott K6 cost £180 fully equipped and had a life expectancy of 50 years whereas, the Conder design was estimated to cost £212 with a lifespan of only 20 years.

Taking all these points into consideration, is was decided that any new design must meet the following key criteria:

- Preference for a cast-iron framework to meet cost and life-expectancy limits;
- Be related to the new house style for public offices;
- Minimise the prospect of successful vandalism;
- Have a flexible mounting method for equipment;
- Not exceed the installed cost of the K6 by more than 10 percent.

On the 23 March 1965, the Postmaster General Anthony Benn, announced in the House of Commons that the Post Office was commissioning new designs for a telephone kiosk and cited that combatting vandalism would be a key consideration.[13] Later that month it was agreed that a three-phase design and development programme would be undertaken comprising an initial feasibility study, followed by a sketch design and then a final development stage, each managed through a separate contract.

A design brief was duly drawn up which stipulated:

- the kiosk should not exceed 8ft in height or 3ft square in plan;
- the aim is to reduce vandalism and theft. Specifically, crevices into which levers or jemmies could be inserted should be avoided and fixing screws should be concealed as far as possible;
- that a fully enclosed kiosk is desirable;
- large areas of glass would probably be essential;
- there was no requirement to include provision for linking kiosks that were positioned side by side;
- kiosks could be grey with some red and the word 'telephone' was desirable but not essential;
- light weight roofing was required;
- 24-hour fluorescent lighting is to be installed;
- space should be allowed to include standard notices;
- flexibility of the installed equipment was desired;
- efforts should be made to minimise the cost of production and maintenance.

Interestingly, this design brief did not mention the need to incorporate a royal crown on the kiosk, something which had been a prominent part of both the K2 and K6. On the 9 April 1965 the design brief was sent out to a short-list of potential designers which comprised Neville Conder, Bruce Martin and Douglas Scott.

Bruce Martin was born in 1917, studied engineering and qualified as an architect at the Architectural Association.[14] After the Second World War he joined the Architect's Department of the Hertfordshire County Council where he became involved in the Hertfordshire Experiment, a pioneering primary school building plan based on pre-fabrication techniques and the concept of child-centred learning. He became an advocate of a modular system of construction in which buildings could be pre-engineered thereby making them flexible enough to satisfy virtually any requirement, being easily scaled up or down. In 1953 he moved to the British Standards Institution (BSI) and in 1956 the Architect's Journal named him one of its 'Men of the Year' in recognition of his 'enthusiastic study of modular co-ordination problems'. He subsequently left the BSI to teach at the Cambridge School of Architecture and to run his own practice. Bruce Martin died on 22 April 2015 aged 97.

Douglas Scott was born on 4 April 1913 and after studying in the Department of Metal Studies at the Central School of Arts and Crafts he went on to work for lighting design companies Osler and Farady in Birmingham and GVD Illuminator in London.[15] In 1936 he joined Raymond Loewy Associates where he became one of Britain's first industrial designers. Whilst there he redesigned the Aga cooker before transferring to the engine department of De Havilland Aircraft Company Limited during the Second World War. Thereafter he took on a variety of freelance commissions and in 1949 formed the design consultancy Scott-Ashford Associates. One of his many clients was London Transport for whom he became involved in the design of the iconic Routemaster double-decker bus. He received three Design Council Awards, was made a Royal Designer for Industry in 1974 and received the Design Medal of the Society of Industrial Artists and Designers in 1983. Douglas Scott died in November 1990 aged 77.

In May 1965, Neville Conder withdrew from the telephone kiosk design process, leaving Bruce Martin and Douglas Scott who in June 1965 met with representatives of the Post Office for discussions regarding the detail of the design brief. They each then submitted their designs by November 1965.

Bruce Martin's design, shown in Figure 6, employed a large single pane of glass in the sides and door with a solid back panel, all raised above ground level on a plinth. The roof was a separate section, raised slightly above the main kiosk and had four glass inserts on which was printed the word 'Telephone'. Douglas Scott proposed a more traditional rectangular kiosk design also mounted on a raised plinth, but with corner pillars supporting Conder style side panels and door, as shown in Figure 7. The corner pillars extended the full height of the kiosk making the flat roof an integral part of the kiosk with the letters of the word 'Telephone' cut-out from horizontal top bars. In reviewing

these designs, the Post Office decided that both were worthy of taking to the next stage and commissioned full-scale wooden mock-ups of each. These were delivered to the Post Office by 4 May 1966 and then on 26 May, the Postmaster General Anthony Benn expressed a preference for Bruce Martin's design which was subsequently endorsed by the Post Office Board in June 1966. Following this, Bruce Martin was issued with a formal contract that covered the provision of engineering drawings and specified the arrangements for on-going collaboration with the Post Office Engineering Department.[16]

Following a competitive tender process, an order was placed in November 1966 with the Lion Foundry Ltd, Kirkintilloch (near Glasgow), Scotland to produce six prototypes which were delivered the following April. These were inspected by Bruce Martin and a final design agreed with the Post Office which resulted in a firm order being placed with the Lion Foundry in January 1968 for the manufacture of 1000 kiosks at a cost of £100 per kiosk. With the installation of the first example at 6-7 Old Palace Yard, Westminster on 12 July 1968, Britain's K8 kiosk, shown in Figure 8, had arrived and thereafter replaced the K6 as the Post Office's standard kiosk.

4. The K8 kiosk in detail

When it was launched the K8 was hailed as a masterpiece of industrial design with its modern style, clean, and uncluttered look.[17] Its large single pane windows were intended to deter vandalism based on the premise that the perpetrator could always be easily seen. The K6 in contrast, with its multitude of small panes of glass and 25W tungsten light bulb meant that attention was drawn to the kiosk itself thereby obscuring the person inside and what they were doing.

Instead of a Gilbert Scott dome, the K8 had a flattened box roof with slightly tapered sides that each contained a glazed Telephone sign. Originally Bruce Martin suggested an illuminated roof made from fibre glass so that it would act like a beacon.[18] In responding to the design brief, he submitted two inter-changeable designs for the top, one in traditional cast-iron and the other, his fibre glass beacon. When assessing these, the Post Office favoured the fibre glass option but when it came to manufacture, it proved impossible to attain a consistent degree of translucence and so it was abandoned in favour of the cast-iron design into which a glass panel carrying the word, 'Telephone', was inserted in each side.

Like the K7 before it, the K8's narrow base gave the impression of the kiosk floating above the ground. However, unlike the K7, which was manufactured from aluminium, the K8 was cast-iron. By 1968 it was possible to achieve the same quality of manufacture and finish with cast-iron as with

aluminium. Therefore, the choice which to use came down to cost; aluminium castings were simply more expensive. However, to reduce weight, aluminium was used for the door.

With respect to the door, Bruce Martin had designed it to be hinged on two 8inch pivot bolts, one at the top and one at the bottom. However, having amassed considerable experience in the operation of kiosks, the Post Office requested that this aspect of the design be changed such that the door was attached by large brass hinges screwed into the door and cast-iron frame as shown in Figure 9. As per the K6, a leather strap was installed to stop the door from being opened too far and a standard closer mechanism was used to ensure it shut automatically.

Bruce Martin had spent considerable time analysing the K6 before embarking on his own design. When interviewed in 1968 he said that the key to the success of his design was 'meticulous analysis of detail'.[19] In comparison to the K6 which comprised 450 individual pieces, Martin's K8 had only 183 and was based around just seven principal components. At the bottom, a sill ring formed the base of the K8 and provided a jig into which the four sides are inserted. A concrete floor was set with a slope of 0.5inch towards the door to allow for drainage of, for example, rain falling from umbrellas. To deter vandalism, the telephone equipment and directory shelving unit were both attached to the back of the kiosk via hidden fixings and raised bosses. The single large glass window which extends to within 500mm of the floor in each side and door was of toughened glass and ensured minimum obstruction to the interior of the kiosk; again, as a deterrent to vandalism. A roof ring completed the main structure and held the sides firmly in place. This roof ring also contained a gutter to collect rainwater and the fixings for the door closer. Finally, the roof slotted over this ring leaving a gap all the way around for ventilation.[20]

There were other important features of the K8 which deviated from previous kiosk designs that are worthy of note. This was the first kiosk to be dimensioned in metric units and to use metric sized screws and bolts; it measured 2450mm tall and 900mm square as per Figure 10. Previous kiosk designs had included a timer switch to the turn the internal light off during day-light hours however, it was deemed cheaper to dispense with this and install a fluorescent light which would be left permanently switched on as is evident from Figure 11. The K8 was also manufactured and transported to site from the factory ready assembled thereby simplifying the installation procedure as can be seen in Figure 12. Finally, the paint scheme was changed with a move away from the previous Post Office Red (BS381C-538) to the more vibrant Poppy Red (BS381C-539). Quite why this was done is not known but, Poppy Red became the new standard colour for kiosks.

The K8 was not restricted for use solely by the Post Office. Indeed, both Kingston Communications in Hull and Guernsey Telecom in the Channel Islands, adopted the K8 but, in keeping with their own corporate colours, painted them cream and yellow respectively. An example of two cream coloured K8s in Hull can be seen in Figure 13.

Overall, when assembled, fully glazed, with the telephone equipment and associated items installed and the concrete base fitted, the K8 weighed 947kg with the aluminium door being the lightest component, weighing 71kg.

Shortly after its launch the Lion Foundry contacted the GPO in 1971 concerning problems with the design and casting of the K8 roof section.[21] The glazed telephone signs were proving difficult to mould and the thin metal section of the roof tended to crack on cooling. Consequently, a new casting was proposed in which the telephone sign was surrounded by a thicker moulding that flowed as a continuous curve from the bottom of the roof section. This new Mk 2 design was approved by the GPO and generally adopted from 1976 onwards. The difference in the two roof designs is illustrated in Figure 14.

During its production run, a total of 11000 K8 kiosks were manufactured and installed throughout the UK. Manufacture was undertaken by both the Lion and Carron (Falkirk) Foundries although the precise split in numbers is not known. However, it would appear that the Carron Foundry only produced the later Mk 2 kiosk with the modified roof design.

Originally earmarked for new sites in urban settings, the K8 was also deployed to replace existing kiosks in situations such as road widening and where an existing phonebox was proving difficult to keep in good order but, generally, was not intended to be used as a simple replacement of existing units. It remained on the books as Britain's standard kiosk until the mid-1980s.

5. Privatisation and the demise of the K8

Following privatisation, British Telecom continued to invest in its public payphone service. Nevertheless, vandalism, maintenance costs and reliability remained on-going problems. To address these and no doubt, to project a new image as a privatised, future looking, company, British Telecom announced a £160 million investment programme to provide an efficient and more reliable payphone service. Branded as 'payphones for the 21st century' a new range of kiosks was introduced that was modern, easier to keep clean, cheaper to maintain, more resilient to vandalism and better able to allow access to people with disabilities.[22] Manufactured by the British company

GKN the first of this new KX range was unveiled to the public in London's Leicester Square on 20 June 1985[23]. However, it was abundantly clear that function and utility now dominated kiosk design, for the KX range certainly lacked the finesse of its predecessors as illustrated by the KX300 shown in Figure 15. One consequence of these modernisation plans was that British Telecom not only intended to install kiosks in totally new locations, but also would replace their existing stock of kiosks with models from the KX range.

This latter point greatly exercised the Thirties Society (now the Twentieth Century Society) for they felt it signalled a serious threat to the British red phonebox.[24] Consequently, in February 1985 they initiated a campaign to resist British Telecom's plans and try to save the phonebox. Their report, 'The British Telephone Box: Take it as red', was sent to 500 local authorities urging them to voice their objections to British Telecom and to follow a policy of conservation.[25] Over 150 responded positively and sympathetically to the campaign.

The problem however, was how to safeguard the phonebox? Existing rules governing the listing of buildings of special architectural or historic interest could be applied providing that the phonebox remained in an unaltered state and had been erected prior to 1940. Based on this the listing of phoneboxes was formally inaugurated by Lord Elton, Minister of State for the Environment with special responsibility for heritage, when he presided over a ceremony on 6 August 1986 to designate several early examples. The ceremony was held at London Zoo where the then only known surviving example of a K3 kiosk (now situated near to the Penguin enclosure) was conferred listed status. This particular phonebox was chosen for it typified the official policy to protect the rare and experimental types. Naturally, the same rules could be applied to the rare K1s, K2s, K4s and K6s but only if they remained in an unaltered state. Unfortunately, as part of British Telecom's attempt to combat vandalism and reduce the associated costs, a policy had been undertaken to replace the glazing bars and small panes of glass in several K2 and K6 kiosks with large, single pane, windows as per the K8. Naturally such modifications not only violated the rules governing listing but also resulted in a rather ugly finished product.

With regard to the K2, which was predominantly located in London, Westminster City Council took the lead and undertook a major survey of its existing stock of phoneboxes which resulted in a recommendation to keep 70 percent of the City's K2 and K6 kiosks. Their view was that the phonebox is an important small detail of townscape that is 'often vital in creating the distinctive national and local character which tourists come to see, and together with other items of street furniture they coalesce to form part of a familiar and cherished local scene.' As a counter to this position, the Council didn't raise objections to British Telecom installing new KX kiosks where these

were needed to enhance the existing facilities. Following Westminster's lead, proposals for listing over 100 K2 phoneboxes were soon forthcoming from the London Boroughs.

The situation regarding the K6 was however different, for buildings erected after 1939 could not be considered for listing. This meant that those K6s installed before the Second World War could potentially be saved, providing of course they remained in a good, unaltered condition, but later examples could not. However, the Thirties Society argued that this was a rather anomalous situation for the design of the K6 pre-dated the War and hadn't changed thereby, negating the relevance of when a specific K6 was installed in a particular location. They put forward an alternative view in which the contribution a phonebox makes to its surroundings ought to be the major criterion for selection and called upon the Department of the Environment to amend conservation area legislation to include street furniture. Lord Elton responded that, 'it would be inappropriate to bring telephone kiosks within the scope of control over the demolition of unlisted buildings in conservation areas' on the grounds that the Town and Country Amenities Act of 1974 had given assurances that small buildings would be exempt. Conversely, the Thirties Society argued that this specific clause applied to structures of no historic interest, that there was no threat to phoneboxes in 1974 and since then there had been a heightened desire to preserve more modern buildings and structures. The Department of the Environment did suggest that unlisted K6s could be chosen for voluntary retention, 'within a conservation area or national park or on a village green' providing that 'preservation must not be at the expense of BT's duty to provide a reliable, modern, efficient service.'

It is important to recognise that BT, and KCOM in Hull, are under a statutory 'universal service obligation' from the telecommunications regulator (now Ofcom) which stipulates the need to provide an adequate level of public call box (phonebox) provision.[26] Inevitably this creates a tension between, on the one hand, a commercial service provider seeking to meet their statutory obligation and on the other, the heritage movement wishing to preserve what the service provider regards as out of date, inefficient and expensive to maintain, infrastructure. Nevertheless, having been transformed from a government owned utility into an independent private company, British Telecom had consequently acquired a valuable part of the nation's heritage which now fell within its remit of responsibility.

Given that an application for, and granting of, listed status could take several months, a stopgap measure was proposed in which local authorities were encouraged to issue a Building Preservation Notice on phoneboxes. Such notices only lasted for six months but could be renewed and most importantly, forced British Telecom to consider any replacement as part of a formal planning

process. It was in essence a delaying tactic and one that added an extra burden on British Telecom which, it was hoped, would act as a deterrent to forcing through change.

Finally, there was the question of the K8 kiosks. Naturally, having been introduced in 1968, they fell well outside of the listing criteria and by his own admission, Gavin Stamp, a founder member and leading light of the Thirties Society, said that even they didn't, 'fully appreciate the need to protect examples of the K8'.[27] At the time the K8 was simply too new and too numerous to warrant concern. Hence, British Telecom was under no obligation or pressure to save the K8 and as a result, they fell victim to a wholesale replacement policy. The K8 simply didn't register on peoples' consciousness as attention was drawn towards saving the earlier models and the consequence of that is that few K8s survived the ensuing onslaught. In comparison to the numbers produced, the K8 has become extremely rare, with less than one percent remaining. Interestingly, this is still not as rare as the K3 for although a similar number were manufactured, there might be as few as five surviving[28]. The situation regarding the K3 however, was quite different. Being predominantly of concrete construction, recovery or removal was problematic with demolition and disposal from site being their normal fate. Equally, when the K3 kiosks were being replaced with the K6 in the 1940s and 50s, there was little interest in terms of heritage or preservation.

6. The K8 kiosk in preservation

The K8 kiosk became the last of Britain's red phoneboxes and also the last design to be manufactured using cast-iron. The KX series, which replaced the K8, and the more recent KX100+, ST6 and Links phonebox designs have all adopted a utility form with function overriding aesthetics.[29]

Fortunately, several K8 kiosks have survived in-situ with some of them now safeguarded by virtue of being designated as listed buildings thanks to a change introduced in 1987 when the Department of the Environment Circular 8/87 removed the 1939 ceiling on listing buildings and replaced it with a thirty-year rule. As shown in Figure 16, the K8 in Hawkesbury Upton in South Gloucestershire is a prime example of a K8 that has been saved and granted listing status. Today any building over thirty years old can be considered for listing and additionally, any building over ten years old, and of outstanding interest, that is being threatened, can also be considered for listing.[30]

Using Historic England's register of listed buildings which comprises nine entries for the K8, data supplied by BT Payphones, field work, and photographs recently uploaded to social-media sites, the authors have compiled Table 2 which lists the K8s that are known to have survived. Locations have been validated using Google Street View (launched in the UK in March 2009 and typically updated

every 3 years) with co-ordinates obtained from Google Maps. This list excludes those K8s which are in private collections or stored within reclamation sites.

The reasons why the K8 fell easy prey to British Telecom's payphone modernisation programme have already been articulated however, might there have been other factors which contributed to its decline and resulted in the K8 being virtually erased from our landscape? When examining the numerous souvenirs and items of memorabilia that feature the phonebox, they are all based on the Gilbert Scott designed K2 and K6 which, like the Routemaster bus and black taxicab have become symbols representing Britain. Is it a coincidence that all these date from a period in British history that today is looked upon with great fondness, whereas the K8 was at its height in the 1970s which has a decidedly different image? In Britain, the 1970s is portrayed as a decade of decline, industrial unrest, political turmoil and dreadful fashion.[31] Has this association irrevocably tarnished the image of the K8? Perhaps the K8 was simply too young to have entered the public's consciousness? When British Telecom embarked on its payphone modernisation programme in 1985, the K2 had been on our streets for 60 years, the K6 for 50 years but the K8 for only 17 years. Equally, the K8 was predominantly to be found in town centres and therefore, less closely associated with residential areas. Home phone ownership might also have been a contributing factor in changing perceptions of, and attitudes towards, the phonebox at this time. That said, the number of phoneboxes continued to expand throughout the 1970s and 80s, reaching a peak of around 150000 in the late 1990s before the true impact of the mobile phone was eventually felt. Finally, it is perhaps worth noting that many of the K2 and K6 kiosks that remain are themselves not historically correct. Crowns were never painted gold and several kiosks have appeared in recent years. In one sense, the red phonebox has become part of chocolate box nostalgia that doesn't accurately seek to preserve the past; how else can it be explained that there are now more red phoneboxes in central London than there ever were before?

Whatever the reasons, the reality is that the K8 has become Britain's forgotten and possibly, least loved of the cast-iron, red phoneboxes.

7. Conclusion and reflection

The design of the K8 phonebox emerged in 1968 from on the one hand, a practical need to address key operational issues associated with reducing maintenance costs and combating vandalism and on the other, a desire to portray a more modern image, consistent with contemporary architecture.

Hailed as a masterpiece of industrial design, Bruce Martin's K8 kiosk exhibited innovation in its design and won plaudits for its appearance. However, despite 11000 being manufactured, it is now rare and virtually forgotten. This naturally has implications for industrial archaeology for when the threats emerged, they were neither recognised nor combatted and the formal mechanisms for preservation weren't fit for purpose.

Telecommunications is a rapidly changing field in which technology has an ever-decreasing lifespan. This brings huge challenges for the heritage movement for when the importance of an artefact is realised and appreciated, it can often be too late. The UK telecommunications sector comprises privatised companies who have shareholders that expect a financial return on their investments. Consequently, companies are driven by profit and focus their attention on today and tomorrow and not what happened yesterday, for the past is of little interest to them, financially or otherwise.

Thankfully, there are notable exceptions. BT continues to maintain a world-class archive whose collections are acknowledged by UNESCO and Arts Council England as being internationally significant and an important part of the UK's cultural and scientific heritage.[32] BT also initiated the Connected Earth project which established a network of UK based museums and organisations, each of which preserves and promotes telecommunications through their galleries and collections.[33] This includes Avoncroft Museum of Historic Buildings which has become custodian of the National Collection of Telephone Kiosks.[34] KCOM in Hull actively promote their collection of cream phoneboxes, offering visitors a guided walk around the city's heritage that encompasses 12 kiosks but, sadly, none of their K8s.[35]

Nevertheless, the K8 story clearly illustrates the challenges which are afoot. When British Telecom launched its payphone modernisation programme, the heritage movement was exercised to protect the older Gilbert Scott designs but didn't perceive of a threat to the modern K8. British Telecom meanwhile was keen to replace its entire stock of phoneboxes, which included the K8, with the new modern KX range. Consequently, the absence of any barriers being placed in front of British Telecom resulted in the K8s being swept aside with seemingly little regard for heritage. The situation today is of course, much worse. For example, the UK mobile phone service was launched in 1985 and since then has undergone five major, and radically different, generations of design. What remains of the first generation and with the life expectancy of a mobile phone being measured in tens of months, how can the heritage movement hope to react when timescales are so short? Regarding phoneboxes, BT are currently removing large numbers of KX and KX100+ kiosks due to the dramatic fall in usage with a few of them being replaced with new Links kiosks. Does this warrant a new campaign to preserve kiosk designs from the late 1980s and 90s?

For telecommunications, the industrial archaeology sector needs a wakeup call. Whilst it is pleasing that Historic England has recognised the importance of telecommunications, it is of little consequence unless procedures are put in place to enact it.[36] The heritage movement in general needs to become far more agile in respect of its contemporary collecting policies, not only in terms of identifying what is significant much earlier but also in its ability to enforce preservation.

The K8 story therefore stands as an example of the lessons that need to be learned to prevent large portions of our telecommunications heritage from being lost to future generations.

8. Acknowledgements

The authors are grateful to BT Archives in London for the provision of archival and photographic material and Avoncroft Museum of Historic Buildings in Bromsgrove who provided privileged access to the National Collection of Telephone Kiosks.

1951	1952	1953		1963	1964	1965	1966
£ 57000	£ 67000	£ 90000		£135000	£ 225000	£ 450000	£ 370000

Table 1: Total cost of repairing damage, excluding loss of revenue, to telephone kiosks.

Kiosk	Location	National Grid Reference	Listed Status
South West England			
K8, Mk1	Ruthern Valley Holidays, near Bodmin, Cornwall	SX 012664	
K8, Mk2	Pontins Sand Bay, Somerset	ST 333643	
K8, Mk1	Walton Street Walton In Gordano, North Somerset	ST 426731	
K8, Mk2	Country View Caravan Park Sand Bay, Somerset	ST 335645	
K8, Mk1	Southleaze Orchard, Mendip, Somerset	ST 479368	Grade II Listing No: 1395584
K8, Mk2	Wimbleball Lake Campsite, Somerset	SS 964307	
K8, Mk2	High Street, Hawkesbury Upton, South Gloucestershire	ST 779869	Grade II Listing No: 1396074
K8, Mk1	High Street, Wickwar, Gloucestershire	ST 723885	
K8, Mk1	Grove Hill, Highworth, Swindon	SU 201929	Grade II Listing No: 1395512
K8, Mk2	Woodland View, Wroughton, Swindon	SU 150819	Grade II Listing No: 1395514
K8, Mk1	Knowlands, Highworth, Swindon	SU 204932	Grade II Listing No: 1395511
K8, Mk1	Langton Park, Wroughton, Swindon	SU 152791	Grade II Listing No: 1395440
South East England			
K8, Mk2 (2 off)	RAF Benson, Oxfordshire	SU 634908	Grade II Listing No: 1393996
K8, Mk2	New Beach Holiday Centre, Dymchurch, Kent	TR 123314	Grade II, Listing No: 1394000
Central England			
None			
Northern England			
K8, Mk2	Holmehead Farm Caravan Park, Ingleton, North Yorkshire	SD 692731	
Hull (KCOM)			
K8, Mk2	Beverley Road junction with Emmott Road, Hull	TA 081332	
K8, Mk1 & Mk2	Princess Avenue junction with Park Grove, Hull	TA 082299	
K8, Mk1	Buttfield Road, Hessle, Hull	TA 035262	
K8, Mk1	St George's Road junction with Hessle Road, Hull	TA 075276	
Scotland			
K8, Mk1	Brinian, Isle of Rousay, Orkney	HY 436275	
K8, Mk1	Isle of Flotta	ND 361937	
K8, Mk2	Old Kilpatrick side of the Erskine Bridge (north)	NS 469727	
K8, Mk1	Old Kilpatrick side of the Erskine Bridge (south)	NS 469727	
K8, Mk1	Erskine side of the Erskine Bridge (north)	NS 457721	
K8, Mk1	Erskine side of the Erskine Bridge (south)	NS457720	
K8, Mk1	Eyemouth Holiday Park, Berwickshire	NT 941647	
Wales			
None			

Northern Ireland			
None			
Railway Stations			
K8, Mk1	Worcester Shrub Hill Railway Station	SO 857551	Grade II, Listing No: 1393363
London Underground Stations			
K8, Mk1	Northwick Park *(painted cream)*	TQ 166879	
K8, Mk1 x2	South Kensington *(painted blue and joined together)*	TQ 268788	
K8, Mk1	Acton Town - platforms 1 and 2 *(painted dark grey)*	TQ 194796	
K8, Mk2	Golders Green *(painted green)*	TQ 252874	
Museums			
K8, Mk2	Science and Industry Museum, Manchester *(Connecting Manchester gallery)*	SJ 829978	
K8, Mk1	Milton Keynes Museum	SP 820404	
K8, Mk2	Avoncroft Museum of Historic Buildings *(National Collection of Telephone Kiosks)*	SO 952684	
K8, Mk2	Postal Museum, London	TQ 309823	

Table 2: Summary of known K8 kiosks and their locations

Low resolution figures and captions

Fig 1. A rather rare example of a London Kiosk No. 1 (K1) erected at Goswell Road. (Photograph courtesy of BT Heritage & Archives. BT image TCB 417/E3564)

Fig 2. The Giles Gilbert Scott designed Kiosk K2 of 1925. This example forms part of the National Collection of Telephone Kiosks housed at the Avoncroft Museum of Historic Buildings. Picture taken 2012.

Fig 3. A K3 Kiosk in Winchester, 1937. (Photograph courtesy of BT Heritage & Archives. BT image TCB 473/P1471)

Fig 4. The Giles Gilbert Scott designed Kiosk K6, introduced in 1935 as the new standard kiosk for universal deployment. Picture taken 2017.

Fig 5. Kiosk K7 designed by Neville Conder, 1962. (Photograph courtesy of BT Heritage & Archives. BT image TCB 473/P6975)

Fig 6. Wooden mock-up of the kiosk design by Bruce Martin (Photograph courtesy of BT Heritage & Archives. BT Reference TCB 417/E 51523)

Fig 7. Wooden mock-up of the kiosk design by Douglas Scott (Photograph courtesy of BT Heritage & Archives)

Fig 8. The K8 Kiosk introduced in 1968 became the Post Office's standard kiosk. (Photograph courtesy of BT Heritage & Archives. BT image TCB 417/E58375)

Fig 9. Brass hinges were used to support the K8 door rather than pivot bolts as favoured by Bruce Martin. The leather strap limits the extent to which the door can be opened. Picture taken 2018.

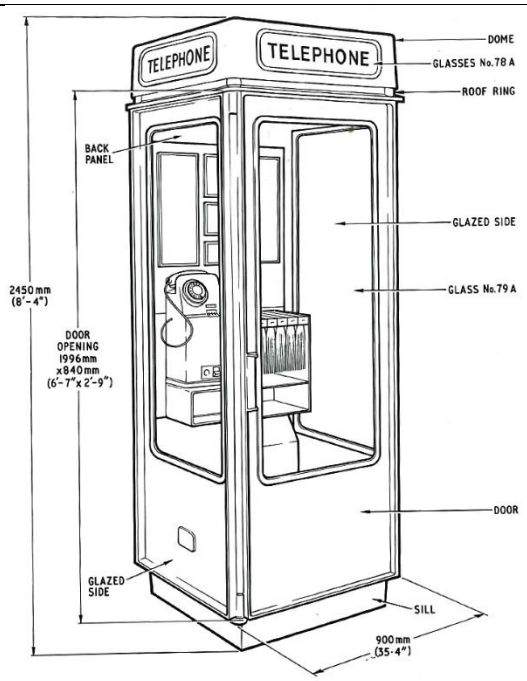

Fig 10. The K8 kiosk was the first to be dimensioned using metric units. (Photograph courtesy of BT Heritage & Archives. BT image W59332)

Fig 11. This picture taken in 1970 of a woman using a K8 kiosk clearly shows the always-on fluorescent tube light. (Photograph courtesy of BT Heritage & Archives. BT image TCB 473/P10607)

Fig 12. This picture taken in 1983 shows a new pre-assembled K8 kiosk being delivered to a remote Scottish isle, to serve 200 people. (Photograph courtesy of BT Heritage & Archives. BT image TCB 417/E77001)

Fig 13: Kingston Communications in Hull also adopted the K8 kiosk however, there kiosks were always painted cream. The kiosk on the left is a Mk1 and the one on the right, a Mk2. (Photograph courtesy of Jack Kirby, 2017)

Fig 14. The two K8 Kiosk roof designs. The upper Mk 1 design was replaced from 1976 onwards with the lower Mk 2 design. Picture taken 2018.

Fig 15. The KX range of kiosks was introduced by British Telecom in 1985. The KX 300 shown here in Churchill, Oxfordshire, is of a triangular design and was supplied either with or without a door. Picture taken 2014.

Fig 16. The K8 Mk2 kiosk on High Street, Hawkesbury Upton, South Gloucestershire which has been granted Grade II listed status by Historic England (Listing No: 1396074). Picture taken 2016.

End notes

[1] These two books provide a general history of UK phoneboxes: Nigel Linge and Andy Sutton, *The British Phonebox* (Stroud: Amberley Publishing, 2017); Neil Johannessen, *Telephone Boxes* (Princes Risborough, Buckinghamshire: Shire Publications Ltd., 2010)

[2] An extreme instance was when the Post Office ended up supplying two K1s with thatched roofs in their effort to provide street kiosks that blended in with their surroundings in Eastbourne.

[3] It is beyond the scope of this paper, but the roof-top signage of the K1 also changed markedly over time, from none at all through to a plain white on blue block sign, and finishing with an ornate ironwork scroll carrying lettering similar to that used of the K2 and K3.

[4] In addition to the K1, K2 and K3 models, there was also a very small number of K4s. Produced in 1927 in a single batch of just 50, the Kiosk No.4 was a derivative of Scott's K2, designed by the Post Office itself. In effect, they 'stretched' the K2, in order to provide additional space to house a posting box and stamp vending machines. Nicknamed the 'Vermillion Giant' not only was it much bigger than the K2, it was also even more expensive. It was also very difficult to find suitable sites for it, needing not only a bigger plot but also clear access to both the front and back. The postal and the telephone departments also had very different views on the ideal situation for a K4 – on the pavement edge, for ease of emptying and collecting the post or against a wall to minimise obstruction.

[5] During the lead-up to the K6, a short-lived kiosk-style flat-pack transportable unit made of metal-faced plywood was developed. Designated the Kiosk No.5 and introduced in 1934, it was for temporary use at exhibitions and shows, and could be moved around from site to site in a way that the K3 or K1 could not.

[6] By the time production ceased, something like 6000 K1s, 1500 K2s and 11000 K3s had been supplied.

[7] Vandalism and theft are just two of the challenges that face the telephone kiosk designer. People wishing to use kiosks for what were euphemistically referred to as 'illicit purposes' are to be thanked for the introduction of full height glazing.

[8] Perhaps inevitably, some Scottish crowns did find their way to sites elsewhere. For example, and perhaps not entirely accidentally, one of the kiosks near Wembley Stadium had a mixture of crowns – the score being Rest of the UK 3, Scotland 1. Today, with many city centres having gained additional heritage (nostalgia?) red boxes, the distinction has become even less clear. There are now several post-1955 Scottish K6s in London, and many of the recently added units along Edinburgh's Royal Mile are post-1955 non-Scottish units.

[9] The Postmaster-General answered questions in the House of Commons about the cost of repairs to telephone kiosks arising from vandalism. HC Deb (20 February 1954) vol 689 c239W; HC Deb (13 July 1967) vol 750 cc123-4W

[10] BT Archives, 'The Development of the K8 Kiosk', BT plc, https://www.btplc.com/Thegroup/BTsHistory/BTgrouparchives/Informationsheetsandtimelines/Info_sheet_The_Development_of_the_K8_Kiosk_2008.pdf (accessed March 4, 2019).

[11] Alan Powers, 'Neville Conder. Visionary postwar architect who worked with Hugh Casson', The Guardian, July 14, 2003, https://www.theguardian.com/news/2003/jul/14/guardianobituaries.artsobituaries (accessed March 4, 2019)

[12] R. W.A. Welch, 'No.8 Kiosk' (internal Post Office memorandum, BT Archives, August 1968).

[13] The Postmaster-General answered questions about telephone and telephone kiosk vandalism. HC Deb (23 March 1965) vol 709 c60W

[14] 'Obituaries: Bruce Martin', *The Daily Telegraph*, May 30, 2015.

[15] Oxford Dictionary of National Biography, 'Scott, Douglas William (1913-1990), industrial designer and educator', https://oxfordindex.oup.com/view/10.1093/oi/authority.20110803100448491# (accessed March 4, 2019)
[16] BT Archives, *Equipment Design – New Kiosk – Various Photos – Development Contract,* reference file TCB 763/948 (1966-68)
[17] M.B. Moore, J.L. Maile and B. Martin, 'A New Telephone Kiosk – Kiosk No 8', *The Post Office Electrical Engineers' Journal,* 62(1) (1969):54-56.
[18] 'The smallest building: The genesis of the Mark 8 telephone box', *RIBA Journal,* August (1968): 320-325.
[19] Catherine Croft, 'Finding Bruce Martin', *The Architects' Journal* (30 January 2008)
[20] Post Office Telecommunications, *Kiosk No.8; Installation Instructions*, C3 Internal G8004 (August 1976)
[21] Post Office Telecommunications Headquarters, *Proposed modification to K8 kiosk dome casting*, BT Archives file TH/AZ/1413 10/280 (1976)
[22] British Telecom, 'Payphones for the 21st Century' (press briefing , June 20 1985)
[23] The KX range comprised the KX 100 which was a fully enclosed kiosk with a door designed to be wide enough to permit wheelchair access. The KX 200 was a pedestal booth design, again intended to offer easy wheelchair access. The KX 300 was of a triangular shape, full height kiosk that could be supplied with or without a door. Finally, the KX 400 was a booth mounted on a short pillar and intended for places where floor space was limited.
[24] John Wright, 'The K8 Kiosk – Last of the Great Red Boxes', Twentieth Century Society, https://c20society.org.uk/casework/the-k8-kiosk-last-of-the-great-red-boxes/ (accessed March 4, 2019)
[25] Clive Aslet and Alan Powers, *The British Telephone Box: Take it was Red: a Thirties Society Report,* Thirties Society, (1987)
[26] Ofcom, 'Universal Service Obligations', Ofcom, https://www.ofcom.org.uk/phones-telecoms-and-internet/information-for-industry/telecoms-competition-regulation/general-authorisation-regime/universal-service-obligation (accessed January 1, 2019)
[27] Gavin Stamp, *Red Telephone Boxes,* Twentieth Century Society, https://c20society.org.uk/casework/red-telephone-boxes/ (accessed March 4, 2019)
[28] The authors are aware of five surviving K3 Kiosks. One is located at London Zoo's Penguin enclosure, one is preserved as part of the National Collection of Telephone Kiosks at Avoncroft Museum of Historic Buildings, one has recently been acquired by Milton Keynes Museum, one is in store at the Science Museum and one is in what is believed to be its original location at Rhynd in Scotland.
[29] Nigel Linge and Andy Sutton, 'The Evolution of the British Phonebox', *Journal of the Institute of Telecommunications Professionals,* 11(1) (2017): 25-31
[30] John Delafons, *Politics and Preservation: A policy history of the built heritage 1882-1996* (Abingdon: Routledge, 1997).
[31] BBC. *Why does the 1970s get painted as such a bad decade?* , BBC, https://www.bbc.co.uk/news/magazine-17703483 (accessed January 1, 2019)
[32] BT, *BT Archives*, BT https://www.bt.com/about/bt/our-history/bt-archives (accessed January 1, 2019)
[33] Nigel Linge, 'Connected Earth – our telecommunications heritage', Journal of the *Institute of Telecommunications Professionals,* 8(4) (2014): 30-33.
[34] Avoncroft Museum, *National Collection of Telephone Kiosks,* Avoncroft Museum https://avoncroft.org.uk/avoncrofts-work/special-collections/ (accessed January 1, 2019)
[35] KCOM, *A guided walk around a cream coloured slice of Hull history*, KCOM, https://www.kcomhome.com/campaigns/trail/ (accessed January 1, 2019)

[36] In Historic England's report published in July 2010 and titled, 'A Thematic Research Strategy for the Historic Industrial Environment', section 3.4: Transport systems, communications and public utilities and Appendix 4 state that 'Communication over distances has evolved from the visual – beacons and telegraph towers through electric telegraph and telephone to the present day digital systems and each stage has left evidence of these advances. Projects which study the evidence for these stages their technology and survival are to be supported to anticipate protection issues.'