

WWII Derelict Post Office Aerial Installation by John Brady

I have long been intrigued by a derelict structure that appears to be the remains of an unusual radio aerial installation on the lower slope on the south side of Caerketton Hill at Boghall on the A702 Biggar Road just south of Edinburgh.¹

There are two wooden masts fitted with climbing rungs. The masts are some 30 metres tall and are about 30 metres apart. Each mast is formed by two wooden poles cut diagonally at the join and held together with bolts and metal bands around the mast. The masts lie on a line running exactly east-west.² They are guyed by steel cables, with a steel cable running between the mast tops. The masts support a number of horizontal wires of uninsulated copper or copper alloy, about 2.3mm in diameter. When I first noticed the masts in 1971 many of the wires were intact. Only five of these wires now remain, but it is clear from the residual broken ends of wire attached to the masts that a pattern of evenly spaced wires extended from just below the top of the masts downwards to within approximately 2 metres of the ground. The wires are not insulated from the masts. On the west mast the wires are wrapped around the mast and secured with staples. On the east mast the wires are attached with hooks and tension adjusters. At the west mast the wires have been linked by a wire running downwards which was until some years ago hanging below the lowest remaining horizontal wire.

In front of the masts, about 10 metres downhill and equidistant from them, three steel frames are set in concrete into the ground. This steelwork occupies an area measuring about 4.5m x 2.3m and looks as if it could have supported a small structure or container.

Nearly 20 years ago I noticed redundant telegraph poles leading towards the site. I don't recall how many poles I saw then. The insulators on these poles would have carried at least four circuits using open copper conductors. Two of these poles remain, and they are now lying on the ground, a result of decay or possibly demolition if they were in a dangerous condition. The markings carved on the pole nearest the site are consistent with markings used by the General Post Office (GPO – later the Post Office and now British Telecom) to indicate the size of the pole and its year of production.³ The carving on this pole indicates the year 1957. The other pole has no carving on the side facing upwards, and it has not been possible to move it.

The east aerial mast bears a carved marking which is not very deep and is not easily seen, but it is sufficiently clear for the marks to be readable. The marks consist of the letters GPO with a number 1908 immediately below, and the letter R below the number. This format differs from that used on the telegraph pole, but it does suggest a GPO installation. It occurs to me that the number may be the year of production, and that the lower section of this mast may be a heavy telegraph pole recycled from an era when repeater amplifiers were not yet

in use and poles carried numerous circuits on heavy copper wires. If the lower section of west mast had also been recycled, then its markings could be at the top end. Punch-hole inspection record plates are fixed to the masts. This type of inspection record appears to have been in use from 1964.³

The nearest buildings to the aerial site are a cottage, and a brick shed with asbestos roof, standing close together about 150 metres from the aerial site. The buildings do not resemble any typical building seen at telecommunication sites. The occupier of the cottage states that the cottage is some 90 years old, and that the shed is used for shearing sheep. There is no evidence of any building nearer the aerial masts.

There is no sign of a mains power supply to the site. In this rural location it is likely that any mains power would be supplied by overhead line, but there is no trace of any power distribution poles. Nor is there a trace of anything suggesting a supply from an underground power cable. A redundant power pole opposite the cottage does have two disused power line insulators, but these look likely to have supported overhead power lines to the cottage as the cottage has a rusty metal pole with two similar unused power insulators. The two fallen telegraph poles do not have any power line insulators attached, those poles being fitted with only the spindles for telephone line insulators, a few of the insulators remaining intact. Might the 50-Volt DC supply from the telephone system have been used for some low-power equipment on the site?

Some years ago an employee working in the Pentland Hills Ranger Service office at Boghall advised me that she had been told only that the masts dated “from the War”. A later item in the Ranger Service newsletter said that research had revealed the masts were part of a high frequency aerial for receiving radio signals from South Africa in World War II, although the source of that information was not stated.⁴ Recent communication from the author of the newsletter item suggests that the information came from a former BT employee who was involved in the maintenance of the masts and former telephone lines to the old Boghall Farm office, and that the South Africa connection was also known anecdotally by the farm staff and by the estates team of Edinburgh University. (The University conducted agricultural research at the farm).

The features of the Boghall masts do not seem consistent with a typical commercial or government aerial installation for long-distance high-frequency (HF, otherwise referred to as short-wave) communication. These sites occupy large areas, with substantial buildings, large high-gain aerials, and back-up power requiring fuel storage and generators. Long-distance HF communication would have been adequately catered for by other sites established in the UK before the War.^{5, 6} To provide long-distance HF communication in the event of invasion in World War II, an emergency long-distance HF transmitting site was established at Saughton Mains in Edinburgh, associated with a new HF receiving facility at an existing GPO low-frequency (long wave) receiving site at Kemback near Cupar.^{7, 8} The use of a distant site for receiving avoids the risk of breakthrough from the high power transmitter typically used for long-distance communication. The existence of a transmitter site in Edinburgh with receiving facility at Cupar would rule out the use of Boghall as a receiving site for the long-distance system.

The copper wires are not insulated from the masts, and therefore would not be suitable as a driven aerial element. They could have acted as a reflector for some driven element in front. The steelwork in front of the masts could conceivably have supported a short mast with some element capable of covering the HF spectrum, although gain would be limited unless a vertical stack of elements was utilised, which would then require some additional support. Also, the site on a hillside seems more appropriate for higher frequencies, at VHF and above, where reliable wave propagation in normal conditions is limited almost to direct line of sight. The orientation of the masts would suggest a system with maximum sensitivity to signals from a bearing exactly due south from the site. South Africa lies on a bearing of about 15 degrees to the east, not a crucial difference but one which might be significant given that this is clearly a professional installation.

The GPO did make use of low VHF frequencies for telecommunication links using rhombic aerials or curtain arrays of dipoles. In the 1930s telephone circuits to offshore islands were provided by this method.⁹ In 1946 an experimental link was established using rhombic aerials at relay stations, between London and Castleton in Monmouthshire, and that link was used later to feed television signals to a local transmitter.¹⁰

During World War II the GPO established an emergency radio scheme to maintain inland communication in the event of disruption to land lines. Further research is required to determine the extent and characteristics of this scheme.⁸ In addition, it appears that small receiving sites were installed near the main HF transmitting stations to permit remote operation by radio link (presumably at VHF) from a central point in London if line communication was lost.⁷ It is not clear just how far these receiving sites were from the associated HF transmitter sites. It seems that this provision applied only to the HF stations at Rugby and Leafield.⁸ However, the possibility that the Saughton Mains site might have been provided with a similar receiving facility must be considered.

The masts appear on an Ordnance Survey map that has been dated 1947 (it is not clear if that is the year of survey or publication). A small rectangular structure also appears on that map, in alignment with the surviving steelwork.¹¹ In the absence of any sign of another possible need for the telegraph poles, it seems that they did serve the aerial site. However, it does seem unlikely that a telegraph pole installed during World War II would need replacement as early as 1957, but that does remain a possibility. If the telegraph lines were associated with the aerial site, then it can be assumed that the site was still in use in 1957. However, the Saughton Mains area is shown on a map dated 1955 already covered with houses.¹¹ Continued use of the Boghall site in 1957 would exclude the possibility of a connection with either the wartime emergency radio scheme or the long-distance facility at Saughton Mains.

Microwave technology was well-established by 1952, when the Manchester to Kirk o' Shotts link was operational.¹⁰ It seems improbable that in 1957 an older type of VHF system with limited capacity would be in use when microwave systems were already available for fixed short-distance links.

All the evidence suggests that the installation was not part of a long-distance HF communication system, and thus that the story about communication with South Africa is wrong. If this information did originate with an employee of the Post Office/BT, then did they or someone else within their organisation provide disinformation to conceal the true purpose of the installation?

About two miles east of the site, on the path from Bonaly to Glencorse, an old warning sign indicates that an area further west into the hills from Boghall was used for mortar and anti-aircraft practice.¹² Exactly when that area ceased to be used is not known. The aerial system does not look like something intended for a simple communications facility on an exercise area.

Radar, navigational aids, electronic countermeasures, and signals interception facilities used during World War II have been fairly well documented, but I have been unable to find any information that might explain the structure at Boghall. It has been pointed out that the GPO, as a department of government, was involved in close cooperation with the armed services.

It may be suggested that the Boghall installation simply provided mechanical support for some other device. That seems unlikely since the wires on the masts are copper, which is more expensive and weaker than steel. The choice of a good conductor like copper suggests at least some electrical purpose, although not necessarily related to radio.

Historic Environment Scotland have included several radio sites on their Canmore website, some of them of comparatively recent construction, but the Boghall masts seem to have escaped attention.¹³

I would be interested in any information or suggestions about this very peculiar installation, any recollections of the missing structure in front of the masts, or any details about similar aerials found elsewhere.

References:

1. [Location Map](#)

2. Ordnance Survey map on smaller scale showing exact position of each mast is available on Midlothian Council planning portal at <https://planning-applications.midlothian.gov.uk/OnlinePlanning/spatialDisplay.do?action=display&searchType=Application>

3. Comparison with information on website of the Telegraph Pole Appreciation Society <http://www.telegraphpoleappreciationsociety.org/36-telegraph-poles/hardware/55-telegraph-pole-hieroglyphics>

4. www.pentlandhills.org/download/downloads/id/120/pentland_beacon_18.pdf

5. Descriptions of typical long-distance HF receiving and transmitting sites <http://www.alancordwell.co.uk/Legacy/hfradio/BTRSint.html>

6. English Heritage survey of a HF receiving site http://services.english-heritage.org.uk/ResearchReportsPdfs/110_2010WEB%20with%20watermarks.pdf

7. A H Mumford: *Long-Distance Point to Point Communication* (1947) Sections 2.1, 2.2, 2.3

<https://www.nonstopsystems.com/radio/pdf-hell/article-hell-mumfrd-47.pdf>

8. BT Digital Archives

<http://www.digitalarchives.bt.com>

The BT Digital Archives website is not at present completely functional. Only a brief description of a document's contents can be viewed, which has allowed some relevant information to be obtained. A new website should be available in March 2017. Some additional information is available from summaries on the BT Archives Catalogue at <http://www.dswebhosting.info/bt/>

9. <https://books.google.co.uk/books?id=3h7R36Y0yFUC&pg=PA131>

10. https://www.theitp.org/knowledge_hub/historic/Short_History

11. Digitised from Ordnance Survey archive. Map dated 1947 at 1:2500 scale available at <https://www.old-maps.co.uk/#/Map/327500/673500/12/100954>

On the same website the masts are not shown on the 1:10560 scale dated 1955, but appear again on the 1:10000 scale dated 1976.

12. <http://www.geograph.org.uk/photo/4676933> and <http://www.geograph.org.uk/photo/903281>

13. <https://canmore.org.uk/>