

THE PENGE PUB EFFECT'

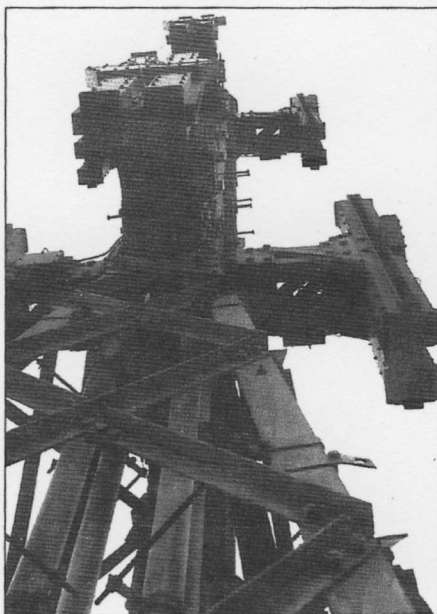
G. C. Platts recalls improvements to television transmitters to overcome breakdowns and poor reception

After a period of experimental transmissions, the first regular television service started on 2 November 1936 and in mid-February 1937 the Postmaster General formally accepted the Marconi-EMI 405 line system as the future standard for the UK. Separate antennas for transmitting the vision and sound signals were mounted on a steel tower erected at one end of Alexandra Palace.

The design of the antennas increased the power radiated towards the horizon at the expense of that directed to areas closer to Alexandra Palace, thus increasing the area of satisfactory coverage. The effective powers of the 17kW vision and 3½kW sound transmitters thus became 34kW and 7kW respectively.

With the advent of the Second World War, the television service was suspended on 1 September 1939, though the transmitters were used on occasions in the war years to interfere with radio and guidance systems used by German bombers.

Experience prior to the war, and the development of radar and electronics during the war, indicated that the production of higher power transmitters would be possible and that transferring the television service to a site further south should be investigated as a means of providing a service to more people, in particular those living on the North Downs. However, of higher priority was an extension of television coverage to other densely populated parts of the UK. Four transmitting stations using 50kW vision and 12½kW sound transmitters, sited at Sutton Coldfield in the Midlands, Holme Moss in the north of England, Kirk O'Shotts midway between Glasgow and Edinburgh, and Wenvoe near Cardiff, using antennas on 750ft. (229m.) masts,



The original 405 line antenna on a 750ft. mast at Wenvoe, used until 1965

were opened progressively during the period 17 December 1949–15 August 1952. Combining equipment was used to enable the vision and sound signals to be radiated from the same antenna, thus reducing costs and wind loading on the masts on these exposed sites, yet retaining the ability to increase the effective powers of the vision and sound transmitters to 100kW and 25kW respectively.

Prior to, and initially after the war, if a fault occurred in the TV production studio, the transmitting station would radiate a locally generated caption – "Normal service will be resumed as soon as possible". Conversely, if a fault occurred at the transmitter, the studio production would be held up until the fault was cleared.

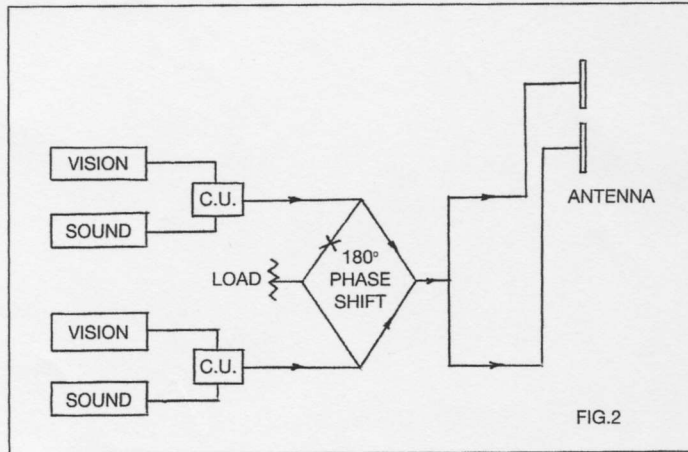
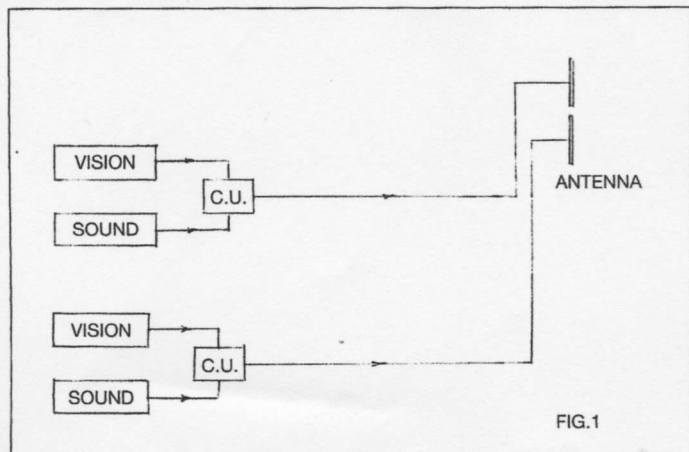
Just prior to the official opening of the Sutton Coldfield transmitter,

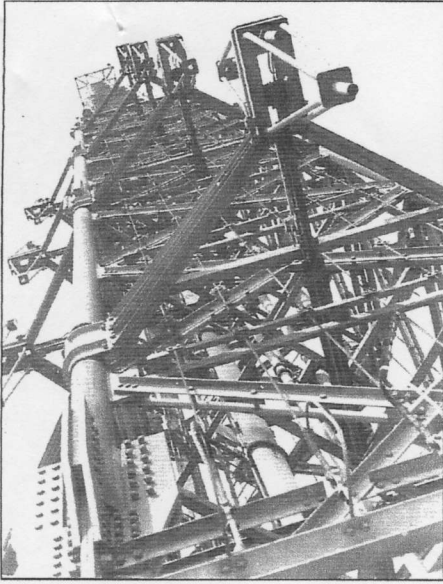
attended by the BBC's Director of Engineering and other dignitaries, a fault did occur which was only just cleared in time for the official opening. I've been told that there and then the decision was made to equip these transmitters with reserve transmitters with one-tenth of the power of the main transmitters, and this policy was implemented forthwith. The effect of operating with the reserve was to make the pictures "snowy" in outlying areas, more so as the distance from the transmitter increased, though programmes were still of entertainment value.

Whilst a big improvement, this arrangement was far from ideal as the gist of a programme was easily lost in the time it took to warm up reserve transmitters and switch them to the antenna. To mitigate this, some broadcasts, including royal broadcasts, were defined as Grade I and the reserve transmitters were warmed up, ready for immediate switching to the antenna.

As television coverage was being extended over the UK, plans for improving coverage in London were crystallising and it was decided to use an eight-tier antenna on a 640ft. (195m.) self-supporting tower on the site of the old Crystal Palace. With this arrangement and the antenna split into two halves, each fed by 15kW vision and 3¾kW sound transmitters, there would be no break in transmission in the event of a transmitter fault and the effective power would approach 200kW with significantly reduced electricity consumption relative to the four high power transmitters already in operation. The general arrangement is shown in Fig. 1.

It was appreciated that, with this high gain antenna, in its simplest form,





Looking up from 440ft. at the upper half of the 405 line TV antenna at Crystal Palace (now dismantled).

there would be some areas quite close to Crystal Palace which would receive a poor service – that is, “snowy” pictures. Accordingly, the antenna was designed to eliminate these areas of poor reception. Consequently, we were surprised to receive reports of very poor pictures in locations where we believed we had taken steps to ensure satisfactory reception. The effect was particularly apparent at a pub in Penge, where the pictures were not snowy but had the general appearance of a black-and-white photographic negative – a phenomena subsequently known as “The Penge Pub Effect”. This occurred at locations where the contributions from two halves of an antenna are almost equal and almost out

of phase so that any small differences between the transitions from black to white in the characteristics of the two transmitters are magnified.

The effect was eliminated by first combining and then splitting the output from the two transmitters generally – as shown in Fig. 2. However, this arrangement does have the undesirable feature of introducing some equipment common to both pairs of vision and sound transmitters and hence the risk, though small, of its failure causing all transmitters to shut down. The load (capable of absorbing 10kW) has to be supplied with pumped water whenever the transmitters are in operation, as the failure of a transmitter results in half the power of its opposite number being diverted to the load, which would immediately overheat if not adequately cooled.

In practice, in the arrangement shown in the two figures, switches were incorporated to enable both vision and both sound transmitters to be simultaneously fed to either half of the antenna, or either vision transmitter and its associated sound transmitter to be fed to the complete antenna, to maximise the effective radiated power if for any reason a prolonged period of routine or fault maintenance was anticipated.

Thus the search for the “Holy Grail” of television transmitting stations with entirely separate chains of equipment, virtually eliminating any risk of loss of programme, ended. The arrangement used at Crystal Palace for the discontinued 405 line service is now used at all the main UHF transmitting stations providing 625 line transmissions in the UK. **V**

Installing a pair of five inch diameter copper feeders at Crystal Palace. Everything is duplicated so that service continues if a fault occurs.

