THE LONDON TUBE

HISTORICAL REVIEW

The World's first underground line - the Metropolitan in London, was opened on 10th January 1863, this operated from Paddington (Bishops Road) to Farringdon Street. The complete Circle Line as we know it to-day being completed on 6th October 1884.
Mention must be made at this stage of the Thames Tunnel built by M I Brunel, which commenced on 16th February 1825 and opened 25th March 1843 - being purchased by the East London Railway in 1866.

The first tube railway - the City & South London was opened for public service on 18th December 1890, this operated from King William Street to Stockwell. However, due to cost implications, only the Waterloo & City and the Central London were opened in 1898 and 1900 respectively. By way of interest, the Yerkes tubes, named after C T Yerkes an American Financier, comprised the 3 tube railways - Great Northern, Piccadilly and Brompton; Baker Street and Waterloo; Charing Cross, Euston and Hampstead, which were eventually merged in 1910 to form the London Electric Railway Company.

The use of steam trains brought the problems of smoke, heat and dirt, so that $90m^2$ 'blow-holes' were constructed at approximately every 1,000m. Electrification came about on 20th May 1900, as an experimental service between Earls Court and High Street Kensington, but was withdrawn 6 months later on 6th November. The first operational electrified line commenced on 28th June 1903 - Ealing & South Harrow. Since this date, the District Railway was progressively electrified, until by 5th November 1905, the last passenger steam train ran.

The start of London's Underground ventilation plant commenced operation in 1903 and was installed on the Central London Line at the western tunnel mouth of Wood Lane Depot (near Shepherds Bush Station); the fan capacity was $47m^3s^{-1}$ and so designed that it displaced the air volume in the tunnel from Bank Station - a distance of 9.3 km in one hour. It was effective mainly during non-traffic hours, when the canvas doors provided in the station passage were closed

Paper on London Tube Ventilation (source unknown)

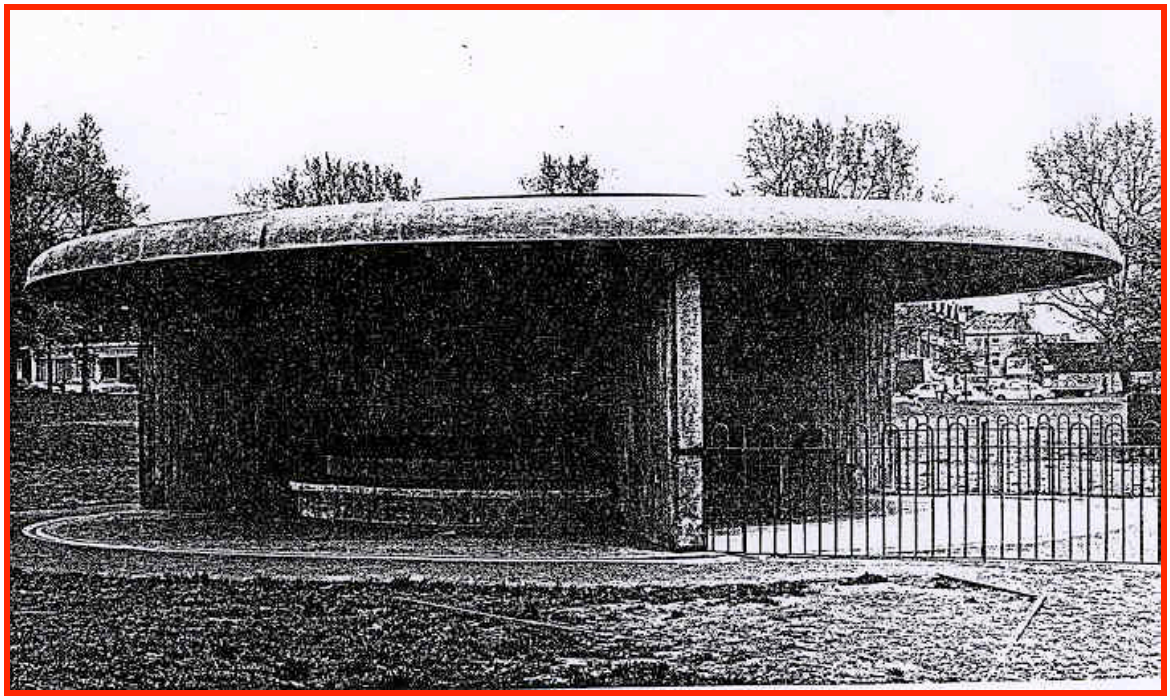
(except at Bank Station).

Comments made by the media in 1906 stating that unsatisfactory conditions were occurring, led to the installation of 9.44m^3s^{-1} capacity ventilation systems at the majority of stations on the Bakerloo and Piccadilly Lines, also the Hampstead Railway (now part of the Northern Line). Five years later the Central London Line had small fans of 2.36m^3s^{-1} installed at most stations. Such fans delivered electrically ozonised air through purifiers (as they were then known), at intervals along the platform and into the tunnel mouth at the ends of the platforms. These purifiers charged the air so highly with ozone, that the odour clung to the passengers - the installations did not remain in service for very long.

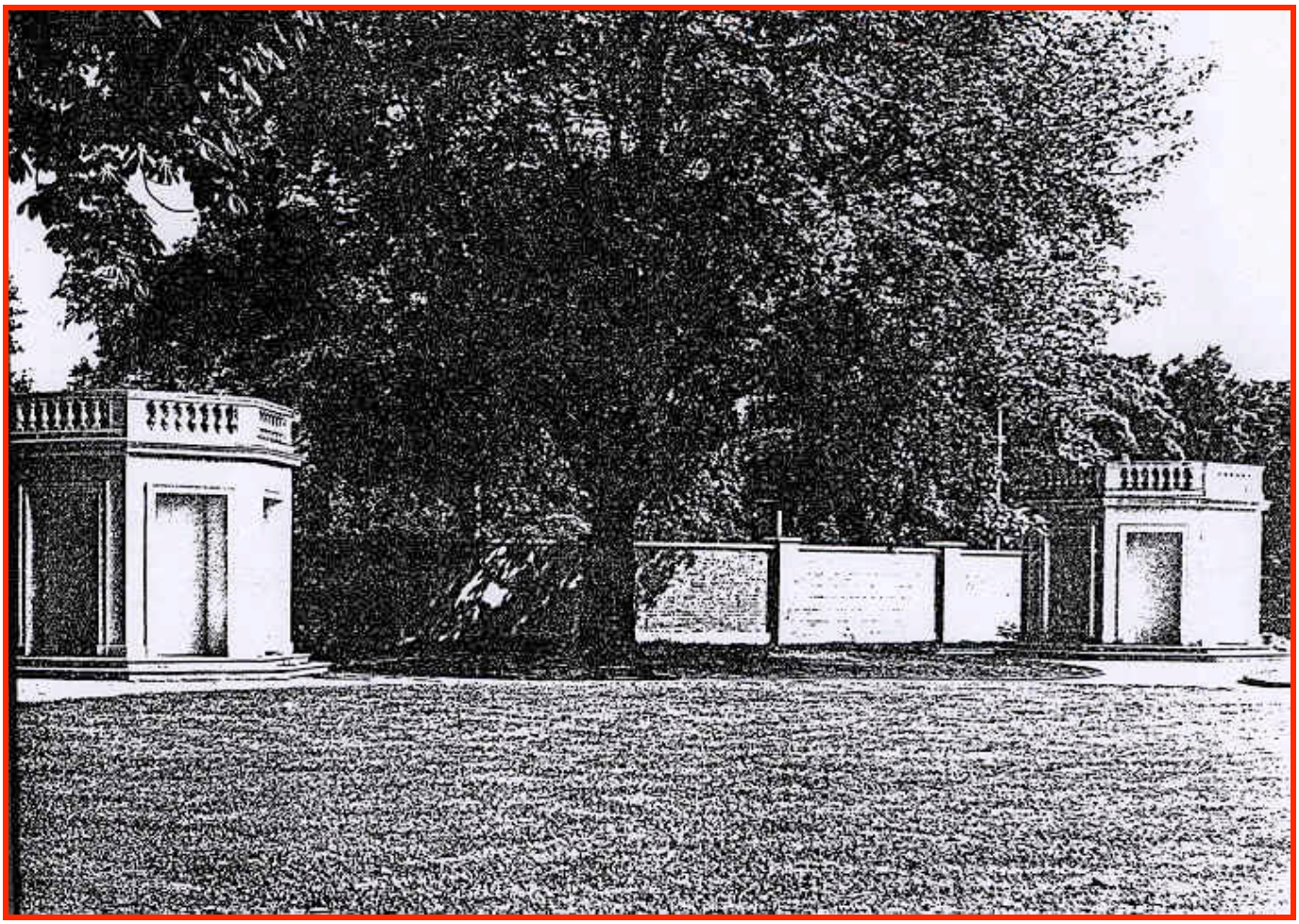
In the period 1926-1930, the tube lines were extended to cater for the increased passenger traffic from the suburbs. Out of necessity therefore, the supply ventilation plant capacity was increased to 16.52m^3s^{-1}. Despite the installation of these systems, investigations showed that undesirable temperatures were still being experienced, so that the fans for new locations were increased by approximately 100%.

The Victoria Line (1968), the Brixton Extension (1971) and more recently the Jubilee Line have axial flow fans installed at mid-stations and are designed to operate as either supply or exhaust units, the capacity ranging from 40 to 50m^3s^{-1}.

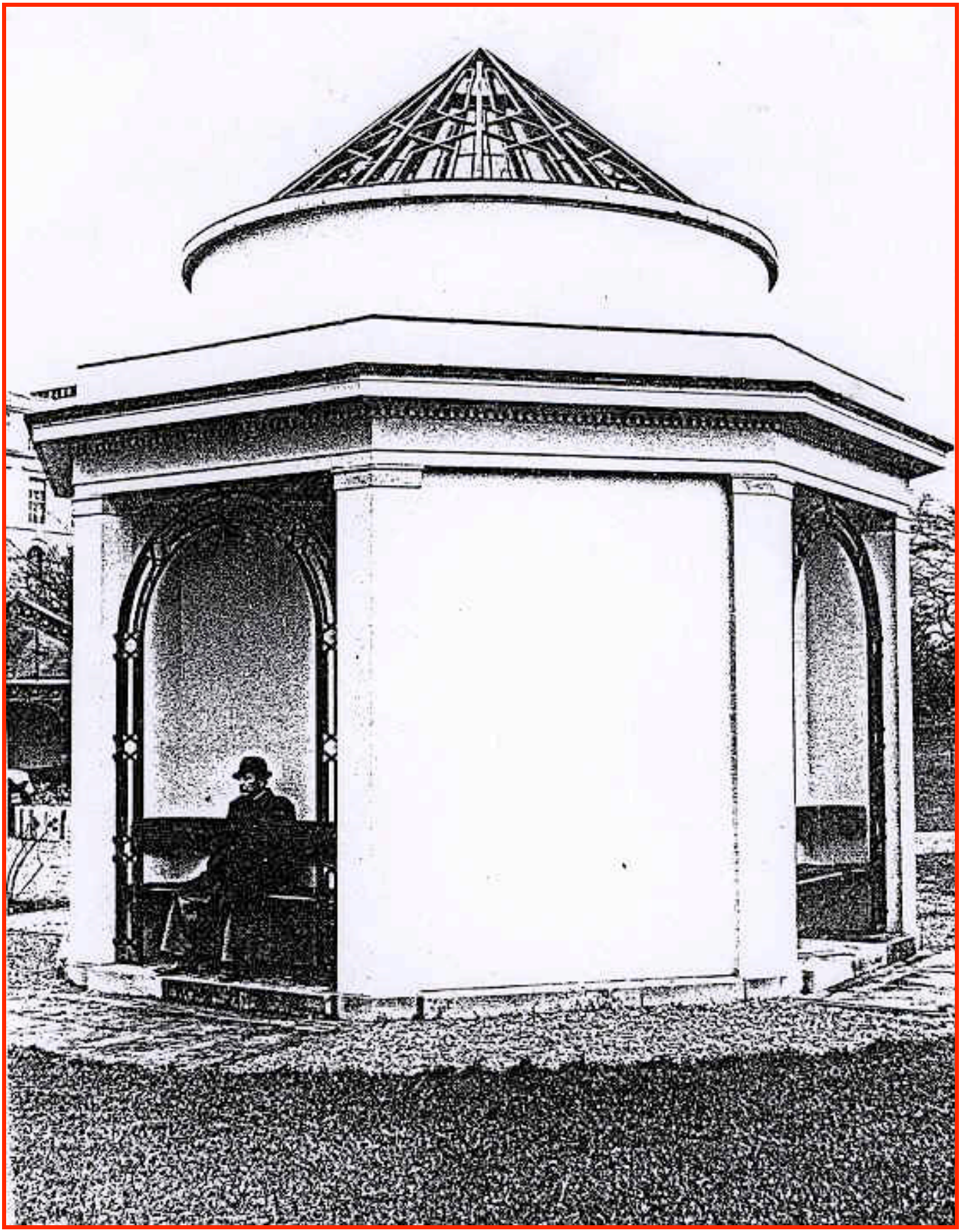
On the grounds of passenger comfort, it was initially decided to operate the fans as supply units in the winter and exhaust during the summer. Unfortunately that change-over has out of necessity (in due consideration of cost & maintenance involvement) to be carried out manually. This took 2/3 days for 2 men and involved re-adjustment of the rotor blades, guide vanes, non-return dampers & reversal of the starter phase links - this was also costly.



Draught Relief Shaft at Highbury & Islington Station

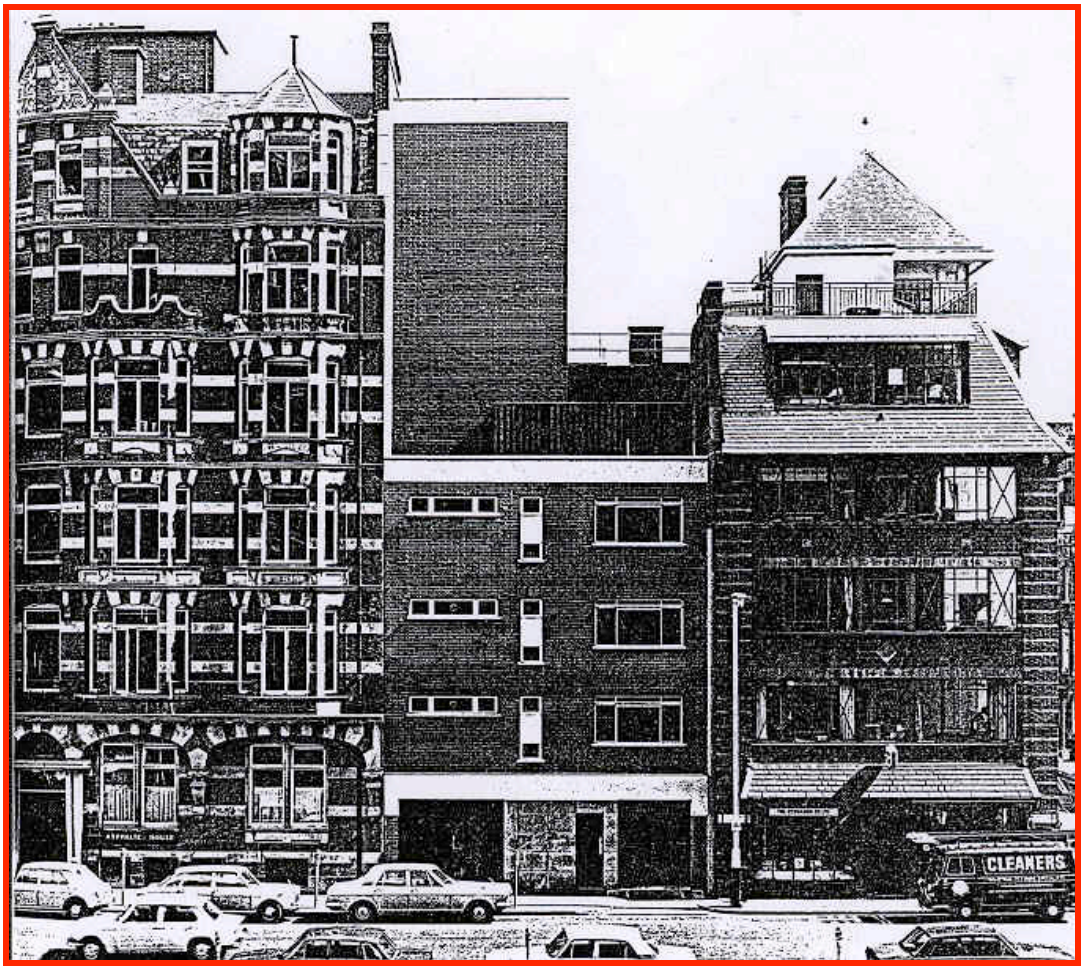


Draught Relief Shaft (left) & Fan Discharge Shaft (right), Regents Park Station

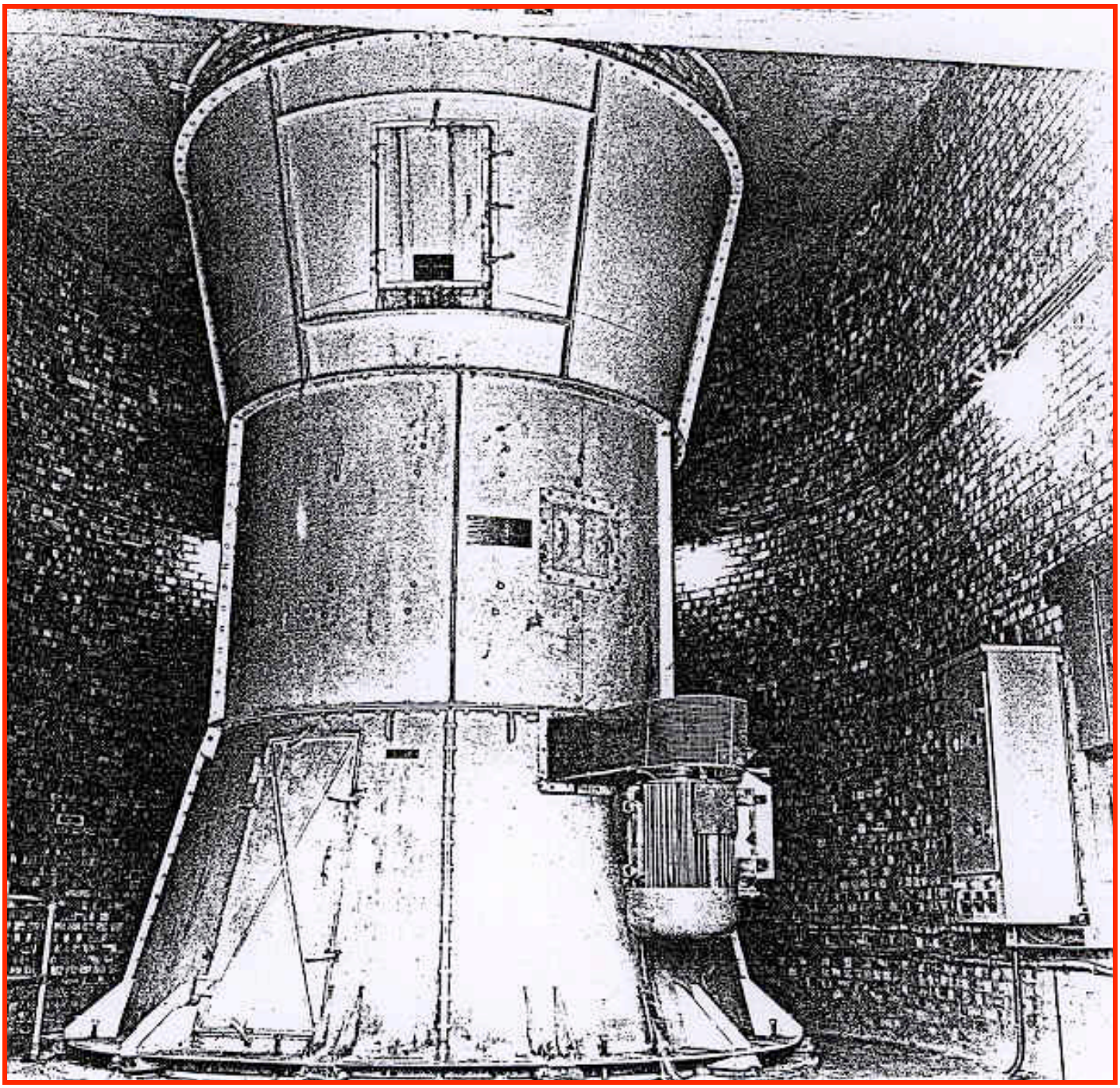


Tunnel Cooling Fan House, Park Square Gardens (Jubilee Line)

Tunnel Cooling Fan House, Gibson Square (Victoria Line)

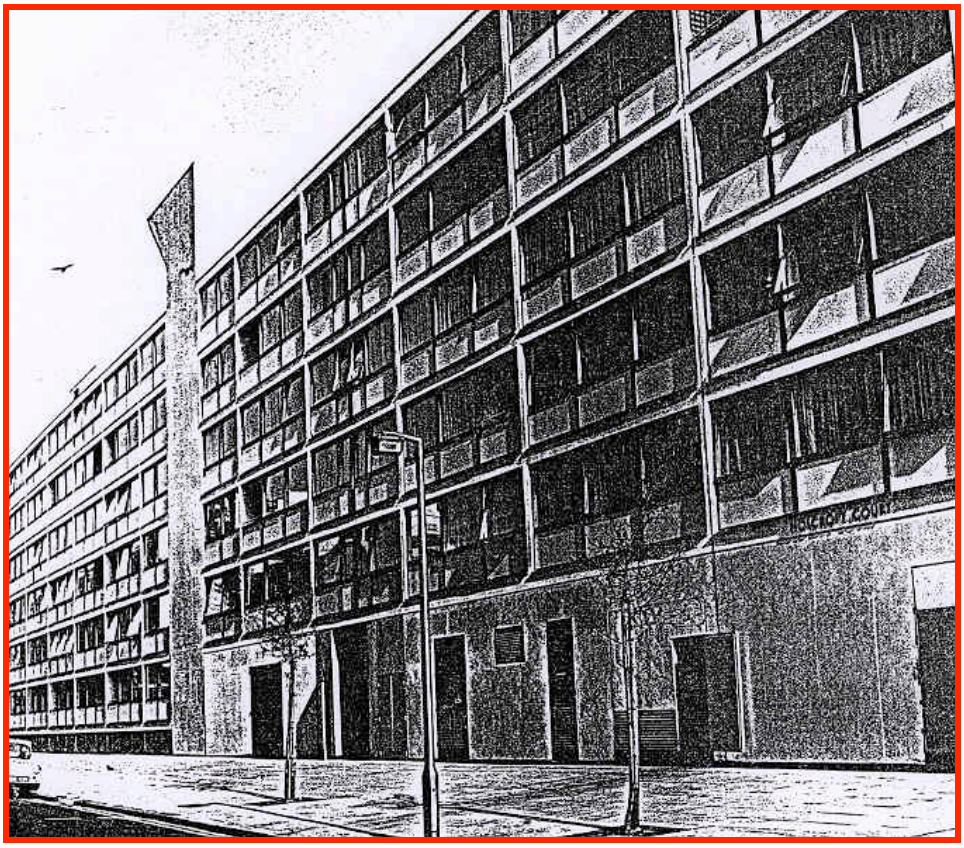


Tunnel Cooling Fan House, Palace Street (Victoria Line)



Tunnel Cooling Fan, Netherton Road (Victoria Line)

Tunnel Cooling Fan House, Moreton Terrace Victoria Line)



Tunnel Cooling Fan House, Great Titchfield Street (Victoria Line)