

Inventive Vents Teachers Resource

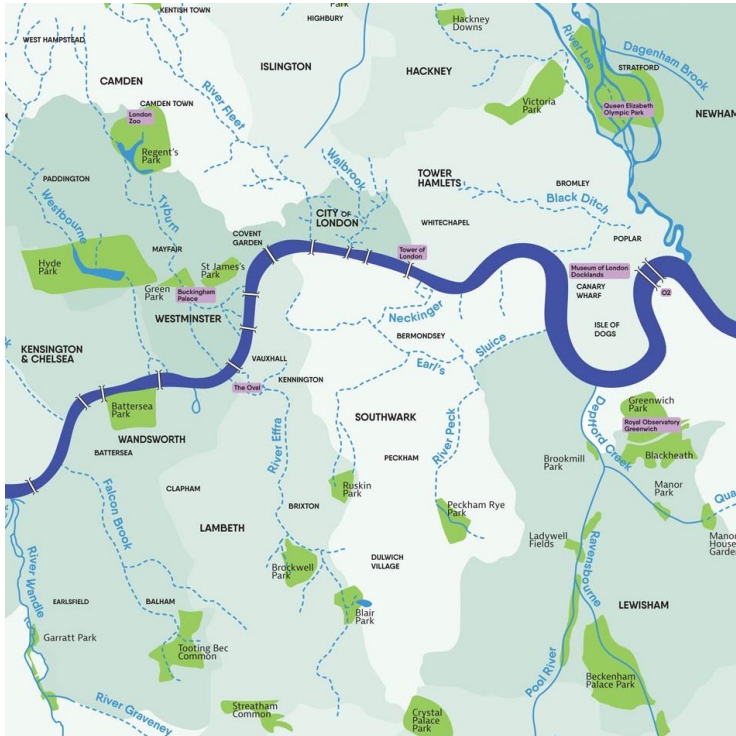
Session 1: Introduction to underground London and ventilation shafts

- **Our Hut**





Underground view – Kings Cross, St Pancras
This indicates tube lines below ground level, train station above but there are also services, (gas, water, electricity) and The River Fleet.



River Thames and all its tributaries. Many of these rivers are now covered over but their routes can be traced from old maps, street names (eg. Fleet Street). They can sometimes still be heard from open gratings in the road.



Jacob's Island – creek used as an open sewer into the 1850's. You can see high level “privies” in the painting which discharged straight into the creek.



The Great Stink - River Thames 1858
 This refers to a summer in 1858 when the River Thames was so full of sewage – “monster soup” politicians were finally forced to act and commission Bazalgette to design a sewer system for London. It is still in operation today.



Cartoons of the day about The Great Stink



Marc Brunel – Thames Tunnel 1825-1843 runs from Wapping to Rotherhithe. This was the first tunnel under a river anywhere in the world. 1869 – the first steam train runs through the Thames Tunnel.



Construction of the embankment 1858, as part of Bazalgette's scheme. The Embankment incorporates the new sewage system for London and ultimately routes for the District and Circle Line.

The print, bottom right, shows steam train running on the Metropolitan line – 1863.

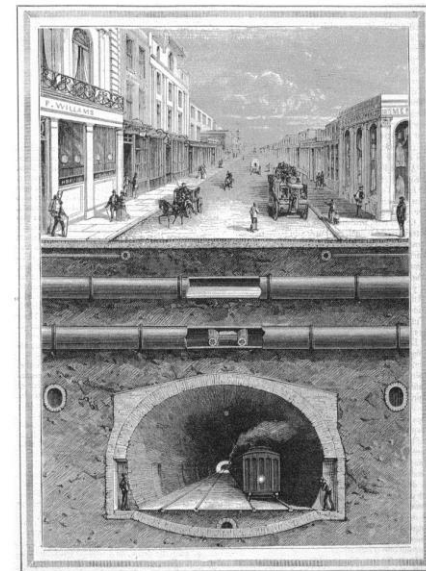
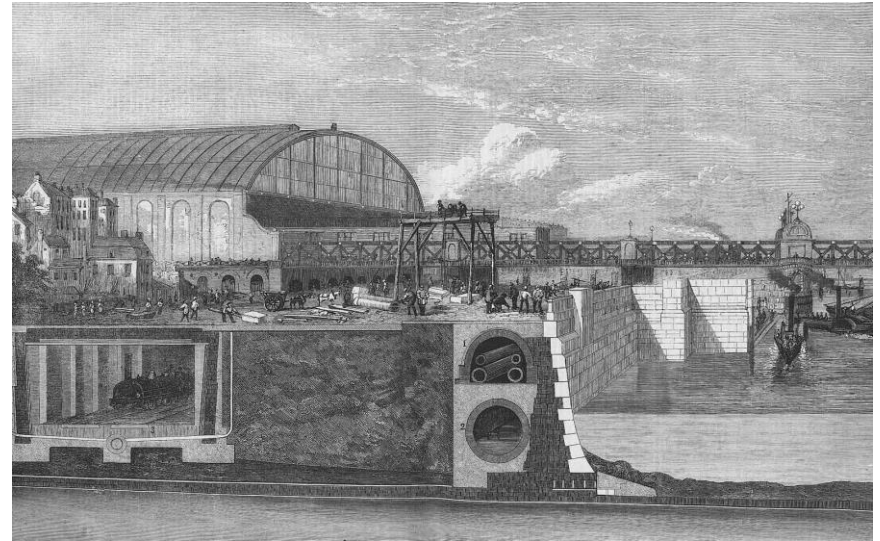
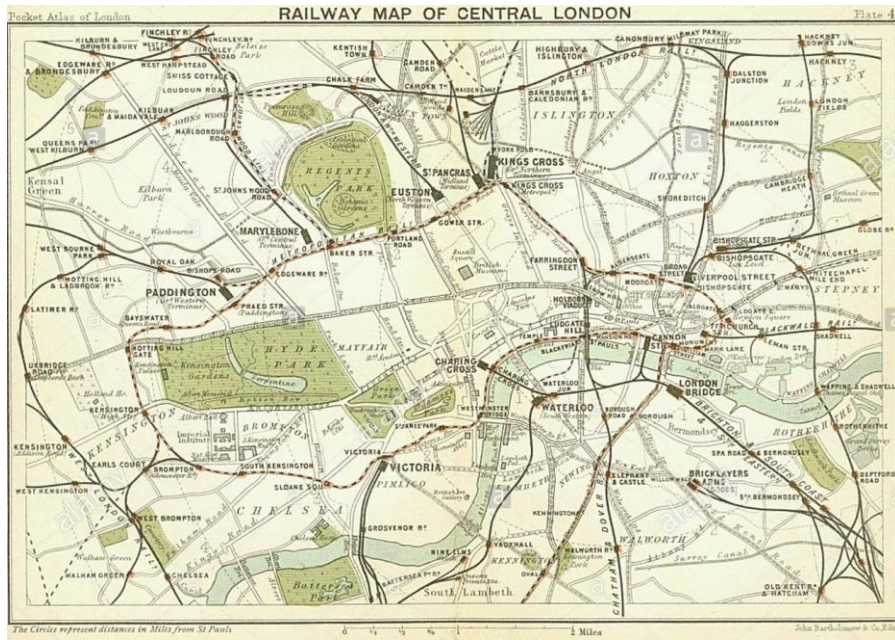
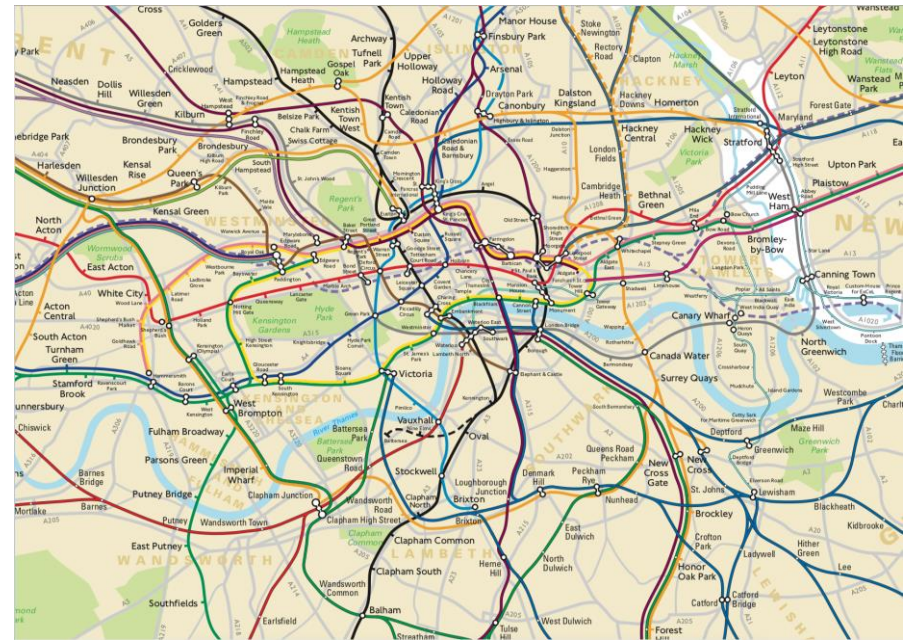


Fig. 8. — Ce qu'il y a sous le pavé de Londres.
 Conduite de gaz. — Conduite d'eau. — Tube pneumatique pour les dépêches. — Égouts. — Tunnel et rails métropolitains.

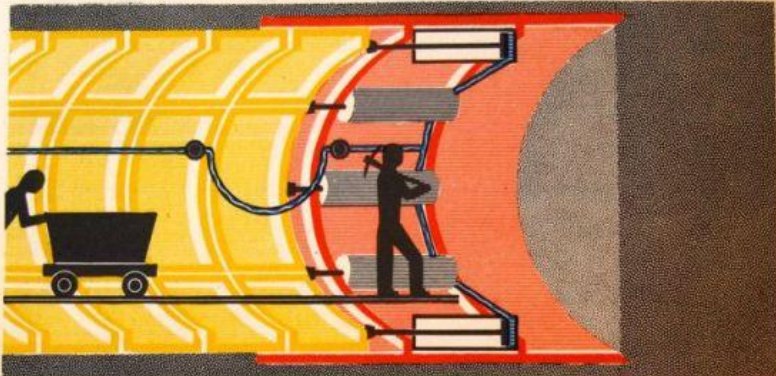


Railways and Metropolitan Line 1863



Tube Map – 2020
 (There are now 270 tube stations and west to east is a distance of 34 miles)

Cutting the Tunnels to Take the Trains



Tunnels are cut by shields like huge apple corers. Inside is a man with a pick.



Ahead of the cutting edge of the shield, he cuts a large hole into the earth.



Water-powered pistons drive the shield forward. Earth falls and is removed.



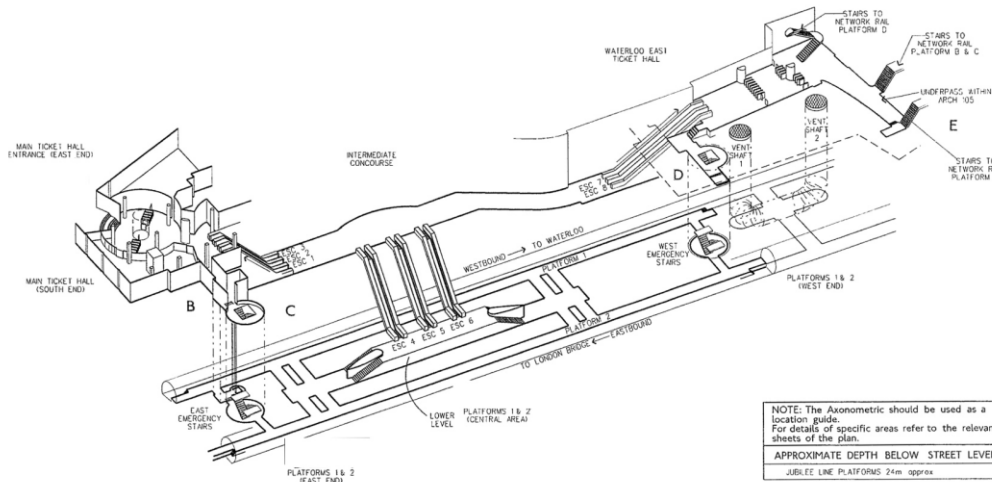
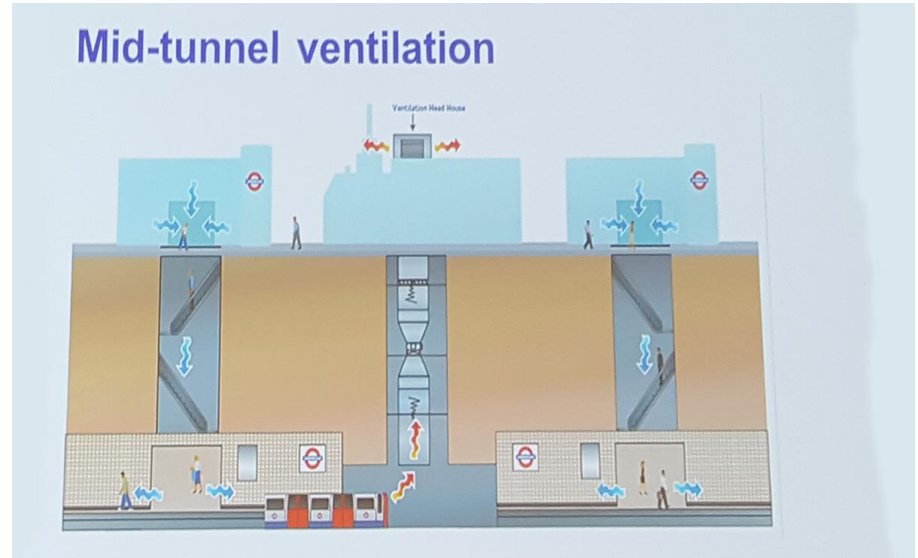
Strips of lining are put in place to support the newly cut length of tunnel.



Steam train in a tunnel – the need for ventilation is clear!

Southwark
Axonometric

STATION
LAYOUT



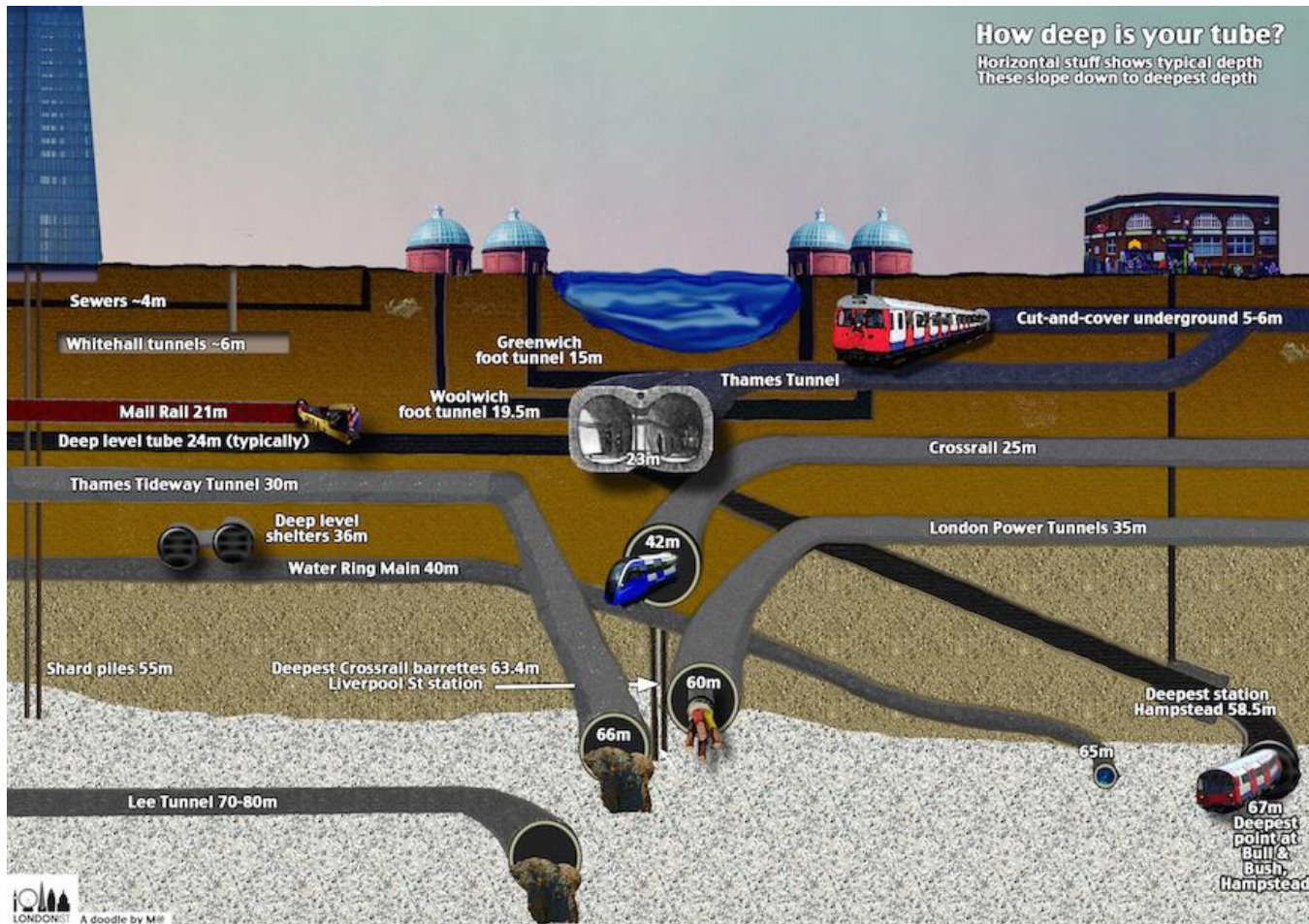
NOTE: The Axonometric should be used as a location guide. For details of specific areas refer to the relevant sheets of the plan.

APPROXIMATE DEPTH BELOW STREET LEVEL
JUBILEE LINE PLATFORMS 24m approx

Axonometric and section illustrating vent shafts at Southwark. The vents have to be carefully located and suitable sites found in the city for them to exit above ground.



Part of the old tunnels at Euston this old Pedestrian tunnel is now used for ventilation on the Northern Line



A section through the ground to indicate the depths which tunnels and services reach. This also shows the need for all the tunnels to avoid one another and how deep they are in relation to the Thames.

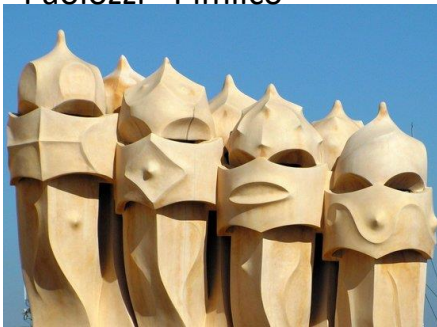


1952 Harry Weatheley, responsible for keeping the ventilator shafts clean at Piccadilly Circus Underground Station.



Paolozzi - Pimlico

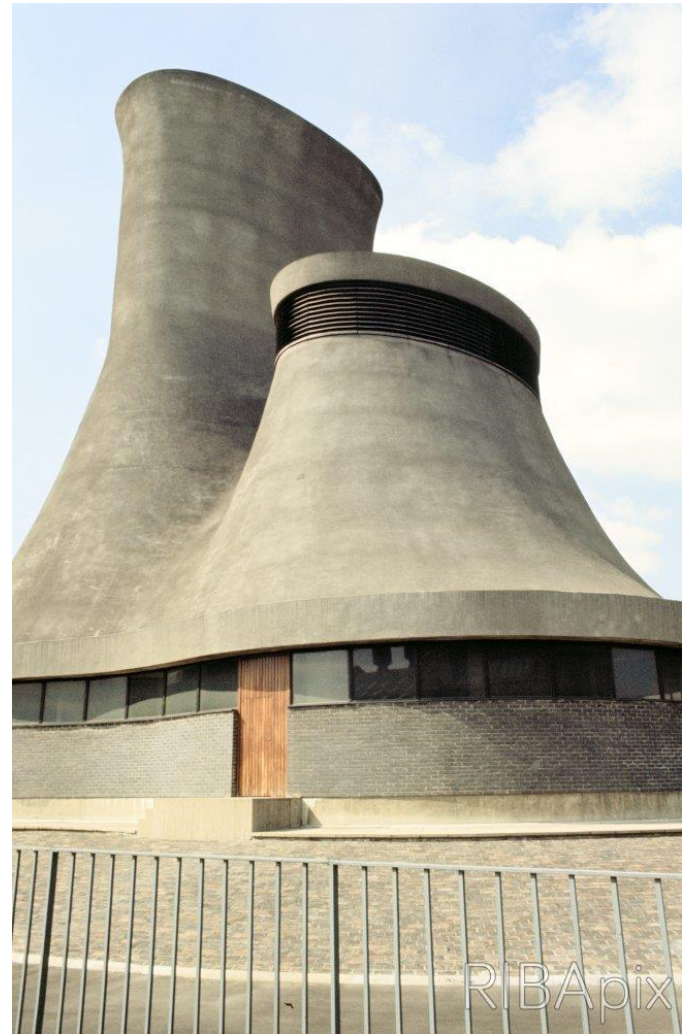
Gaudi



Gaudi



Heatherwick –
Paternoster Square



Terry Farrell – New Blackwall Tunnel

Examples of Ventilation Shafts on the surface.
Hot air exits from the top with cold air intake at low level.



Thomas Heatherwick – “Angel Wings” under construction.