

## The Roman Water Supply

The Romans are not the first to bring water from a distance in aqueducts, but they have turned it into a science. As a consequence Roman citizens have continuous access to clean, fresh water for drinking and washing.

A cross section through the Aqua Claudia, carrying the more modern Aqua Anio Novus above it, as it approaches Rome on an arcade across the plain.

Aqueducts approaching Rome meet in a tangle. These two arcades actually carry three water channels each, the most recent at the top. The line of trees at the top marks the route of the Via Appia.

Two aqueducts are fed by the lakes to the north of Rome, and serve the northwestern districts of the city, including the newest, the Aqua Traiana, built by Emperor Trajan, which supplies the region on the west bank of the Tiber.

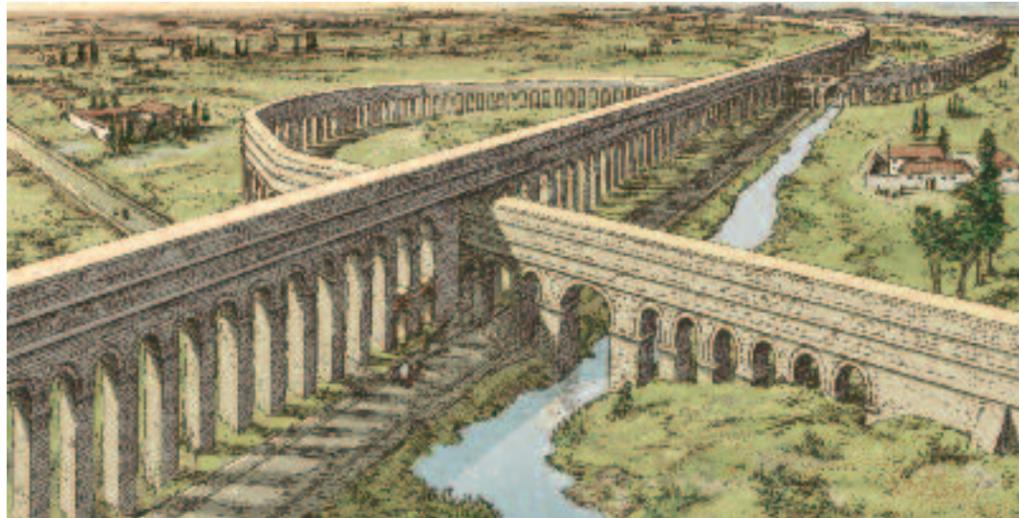
### How an aqueduct works

An aqueduct relies on gravity, so it is built on a carefully calculated downhill gradient from its source to the city. If necessary, a river valley is crossed by carrying the channel on a bridge. When a long, shallow valley gets in the way, the water is diverted in a series of closed pipes. The pipes pass down one side of the valley and up to a lower point on the other side and back into

Waterproof concrete has made possible the miracle of constant running water for almost all of Rome. Since 312 BCE, when the first aqueduct, the Aqua Appia, was built by the censor Appius Claudius Caecus, no less than nine other major aqueducts have been constructed. Between them, they discharge some 298,000 gallons of water every day.

Only about 10 percent of the aqueducts run above ground, with the rest routed at ground level or below. But it is the graceful arcades that everyone most admires.

The waters of the River Anio from the Apennine foothills to the east of Rome feed all but two of these aqueducts. The Aqua Marcia, completed in 144 BCE, is renowned for the purity of its water. It was the first to be carried across the plain from Tivoli to Rome on an arcade, and cost a great deal of money to build. Money was saved on two later channels, the Aqua Tepulia (125 BCE) and the Aqua Julia (33 BCE), by building them on top of the Aqua Marcia—a triple-decker striding across the plain.



A domestic drain with tiled top (see opposite) at Rome's port of Ostia.

the aqueduct channel. This works on what is known as the "inverted siphon" principle, since water always finds its own level.

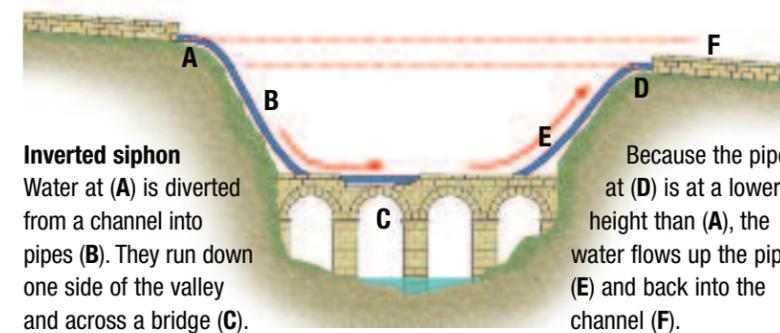
The aqueducts require a great deal of maintenance to keep them running. This is the responsibility of the *Cura Aquarum* or Water Department. It employs hundreds of engineers, overseers, and slaves. Inspection chambers are built at regular intervals for checking water levels, purity, and flow. Obstructions can be removed and limescale cleaned from the channel.

**Bottom right:** Public fountains stand at most intersections. There is no faucet, and the water flows into the basin and then into the drain. One runs under every major street, eventually joining the *cloaca maxima*—the great drain. Lead pipes carry fresh water and branch pipes supply fountains, and private and public buildings.

### Water for bathing and drinking

The principal purpose of the aqueducts is to supply water to public baths. But thanks to this continual supply, there are plenty of public drinking fountains to supply the vast population that does not enjoy a water connection at home, and to flush the public lavatories or *foricae* (see also page 93).

An aqueduct arrives in the city at the highest point, where the water enters a series of settling tanks to remove any sediment, before passing into a large distribution cistern known as a *castellum*. From here, the water is distributed through the large lead pipes that supply various parts of the city.



While the water gushing from Rome's many fountains is free, householders have to pay for a connection. They are charged according to the pipe diameter entering their house, the standard measuring unit being the *calix*, or nozzle. *Calices* come in several sizes, depending on how much water the householder requires.

Taps or valves are rare, and the water simply runs 24 hours a day, overflowing from a cistern into the drain. This is usually placed in the kitchen area of a town house and probably runs under the nearby latrine before falling into the civic sewerage system.

### Sophisticated sewers

While a 24-hour water supply is wonderful, the fact that it never stops running means that adequate provision for drainage is essential. Underground sewers, usually built beneath the streets, carries overflow water and waste from the latrines.

In Rome the sophisticated system of local sewers connects to larger channels and eventually to the *cloaca maxima*, or main drain. This flows out into the Tiber. Outside the city, private houses and the larger inns discharge their overflow water and waste into a large soakaway called a cesspit.

The sewers are equipped with manholes at regular intervals that provide access for the municipal slaves to carry out regular cleaning and repairs.

