

Environmental Issues in the Roman World

III: Waste Management

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Today, most of us (or city-dwellers at any rate) take garbage collection, drainage and sewage treatment plants for granted. But it requires only a garbage strike or a backed-up sewer to remind us how ghastly life would be without these modern waste disposal facilities. Now picture yourself living in the ancient world (or even in the Middle Ages), deprived of these services, and you can readily imagine the health problems and other inconveniences which had to be either stoically endured, or dealt with by law or ingenuity.

Garbage, like charity, begins at home. How do you dispose of vegetable peelings, broken dishes, meat bones, and oyster shells? In homes with earthen floors, archaeologists often find such materials embedded in the dirt, together with lost coins, which suggest that these items were accidentally trodden into the floor, while the bulk of the refuse was presumably swept outside. In the homes of the affluent, banquet guests threw bones and other scraps onto the floor, to be swept up by slaves. Roman mosaics sometimes depict the asaroton oecon ("unswept room", mentioned also by the elder Pliny) covered with rubbish -- whether to provide visual attestation of the delicacies served by the host, or to tell the guests it was perfectly acceptable to toss unwanted items onto the floor, is unclear -- and in one example, a small mouse is shown nibbling on a discarded morsel!

Those living on the ground floor could sweep their garbage into the street, but dwellers in upper storeys were accustomed to tossing rubbish out of the window: Juvenal, in his

third Satire, warns of the danger to pedestrians of cracked pots being thrown from above. In addition to kitchen debris, most households kept animals, not only dogs but poultry, sheep, swine, or even cattle, inside the city (Horace's second Epistle attests pigs running through the streets of Rome). These beasts undoubtedly cleaned up the edible rubbish in the streets, but left behind piles of dung.

Pottery, being easily breakable but virtually indestructible, was the most common form of non-biodegradable rubbish. At the docks of Rome, countless thousands of emptied transport amphoras were unceremoniously dumped in a huge mound 35 metres high and 845 metres in circumference, known as the Monte Testaccio ("mountain of potsherds"). Broken pottery is also the most numerous find on Roman archaeological sites, sometimes weighing-in at several tons.

Modern calculations of waste output in pre-industrial towns are staggering. A town of 100 households (about 500 people) is estimated to have produced every year 14.6 million litres of dirty water, 182,500 litres of urine, 36,500 kg of human feces, 182,500 kg of solid rubbish, and 8,100 kg of ash (note that animal droppings are not included). The problem naturally arose, how to get rid of all this waste. We know from mediaeval parallels how bad the situation could become: towns were filled with rubbish piles and dung heaps, people relieved themselves at night from bedroom windows, butchers tossed animal guts into the town square or the river, and the streets were so filthy that it was necessary to cross

them on stilts or wooden bridges. As late as 1810, a visitor to Edinburgh recorded that "passing through the narrow streets, morning and evening, you scarcely know where to tread, and your head is as much in danger as your feet" (this sounds uncannily like Juvenal's description of Rome!).

The Romans, however, made provisions to deal with these problems. At Rome a board of four junior magistrates was charged with care of the city streets, which included not only repairs but cleaning. In smaller towns, this function was performed by the local aediles. In both cases, the actual cleaning was undoubtedly performed by public slaves: but there were also regulations designed to discourage litterbugs. The Digest of Roman law prescribed that the aediles "must not permit any quarrelling to take place in the streets, nor any filth, dead animals or skins to be thrown into them". It also obliged homeowners to clear the gutters in front of their houses, and made residents responsible for any damages to pedestrians resulting from the throwing of solid or liquid waste into the streets. A Roman inscription from Aix-les-Bains in France imposes a fine on anyone who dumps rubbish outside the Temple of Mercury. At Pompeii, the streets were provided with stepping stones, especially at intersections, allowing pedestrians to cross from one sidewalk to the other without stepping in puddles or worse.

Various means were devised to recycle used pottery. The elder Pliny recommends using old amphoras to line tree pits. Pots were frequently broken into smaller fragments and used as aggregate in concrete, or mixed with lime to produce a plaster called opus signinum, used as a paving material and as a foundation for mosaic flooring. (Regrettably we have no information on whether the Romans ground up their pottery for use as an aphrodisiac, as was the practice in

mediaeval Europe.) Paper was also recycled: Martial expresses the wish that his poems, written on papyrus, will not be used for wrapping fish, incense, or pepper.

The paved streets of Roman cities had large sewers beneath them, fed by drains from private houses and from public buildings emitting liquid waste, such as bath houses. These sewers were large enough that slaves could crawl through to clean them, and such cleaning (an unspeakably noxious task) is mentioned in several inscriptions. At Rome, the sewers emptied into the Cloaca Maxima; at Carthage, the waste flowed merrily into the sea. In private homes, the toilet was often located in the kitchen. While this may seem unsanitary to us, the reason was that the kitchen was often the only room equipped with a drain. At Ostia, the public latrines were located next to a fuller's shop: the urine was then "recycled" into the fulling vats. A similar setup presumably applied at tanneries.

If the Romans solved the problem of liquid waste through hydraulic engineering, manure remained a hazard. Fortunately, though, manure was useful as a fertilizer, not only in urban gardens, but on farms surrounding the town. According to Cato, Pliny and Theophrastus, manure was also spread on lumber to harden it to prevent splitting (the ancient equivalent of pressure-treating?). There was even a minor god named Sterculinus who supervised manuring. There were thus plenty of consumers who were only too happy to collect the valuable compost from the towns and carry it to the countryside, in mule-drawn carts or other forms of conveyance. Cato says manure can be carried by pack-ass, in wicker baskets, or on "manure hurdles". The ancient agronomists were also aware of the fertilizing value of wood ash, and perhaps this was carted out of town as well. Because of the practical

problems of long-distance hauling, urban manure tended to be used within a radius of three to four kilometres from the town. This was the zone of

intensive market gardening for urban consumption. Thus, the pragmatic Romans were able not only to turn food into waste, but waste into food.