

## What Was in the Water?: An Intensive Look at Components Present in or Added to Roman Bathwater

According to Pliny the Elder, *aquarum salubrium sapor odorve nullus esse debet*: it is a necessity of healthy water that there be neither taste nor smell (NH 31.37). Here, he presents two of the four principles by which ancient water was assessed: temperature, appearance, taste, and smell. These principles were applied to both drinking water and bath water, and they provided parameters throughout the empire as to how water should be. In this paper, I explore the quality of water in Roman water systems – particularly in the Roman baths - based on these parameters. I also briefly discuss how Roman water may have measured up to modern standards for potable water.

For the first part of this exploration, I look at the chemistry of the environment in Rome and its surrounding areas to determine what substances would be naturally occurring in the water: calcium, lead, salt, sulfur, and other basic turbidity. There is debate as to whether a significant amount of lead from the pipes leached into the water (Hodge, 1981 and Jackson, 1999). For the next part, I examine different substances that were added in different bathing practices for various reasons. Ancient sources such as Frontinus, Pliny the Elder, Seneca, Vitruvius, and others provide untapped information on these topics; a number of minerals, herbs, and other substances were added to the water to improve the water for health or cleanliness. I examine each of these substances based on their proposed health benefit as well as their actual reaction when mixed with water.

Through this research, I can begin to assess how salubrious the waters of Rome truly were. In conclusion, the various practices the Romans employed in their bath houses offer the potential that water could have been relatively sanitary. The filtration system in the *piscinae*

*limaria* filtered out solid matter such as rocks, sand, and some dirt and sediment. By adding salt to the bathwater, the Romans managed to further remove clay and sediment due to the chemical ionization. Moreover, by exposing the baths to sunlight through the large, Romanesque windows of the bath complexes, the Romans managed to inadvertently purify the water even further with Solar Water Disinfection (Dawney 2012). Although their water would have been hard and mineral-heavy, the extensive addition of acidic substances (particularly wine and vinegar) reduced the naturally high pH of the calcium-filled alkaline waters. Because of these four components – the piscinae, the salt, the sun, and the acids – Roman bathwater had the potential to be quite clean, clear, and sanitary.

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