

ROMAN INNOVATIONS

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Overview Ancient Roman civilization, which endured for a millennium and a half, depending on the cut off point you assign it, expressed the Romans' strong group desire to make *daily life* comfortable and efficient, to achieve a strong and protective *military presence*, and to *erect fitting memorials* to the great ancestors who had made the civilization possible. This three pronged social desire, of the Romans, was the driving force behind the civilization's advances in **technology**.

Comforts of Daily life For over a millennium, but especially in the privileged period of the Pax Romana, the semi-global peace that the Romans made prevail from the investment of Augustus to the fourth century C.E., the Roman people were tireless in improving the conditions of daily life. Let's review a few of their accomplishments.

Water The Romans went far to make water their friend, to devise means of bathing, assuring clean drinking water and clean public baths, to maintain hygienic hand washing practices, to create practicable flush toilets, and, through their brilliant system of aqueducts, to acquire the purest of waters from distant water sources.

Temperature control The Romans were adept at providing wood and charcoal sources with which heated braziers could function, and to keep their rooms at a closely regulated temperature, any time of year. Wealthier homes could be equipped with a *hypocaust* system, in which under-the- foundations streams of warm water would guarantee year round temperature comfort.

Roads The Roman road system was extensive, of great value both for individuals and for military movements, and above all--as we can still see today in Britain or France--offered wonders of careful construction. Typically the road bed was dug out down to bedrock level, covered with ground rock, then filled in with a layer of pozzolanic ash which proved chemical resistant and highly binding, and finally with broad polygonal paving stones. These road arteries were durable, and indispensable to the passage of goods and weapons.

Military prowess The Roman army was a daunting force in its heyday, say until the Age of Constantine in the fourth century C.E., and could during this period be counted on to repel barbarian incursions and to provide citizen security over a vast area. Among the technological advances, that made the Roman army formidable, were the latest in bronze armor, equipment and training for medical surgery--which saved innumerable lives on the battlefield--ready to hand pontoon bridges which could be rapidly assembled in siege warfare, artillery equipment and strategies for its use, and *Greek fire*, the terrible weapon used by the Byzantine navy, and likened today to an early form of napalm.

Memorials to past greatness An observant walk through downtown Rome, today, will impress us with the city's monumental character, the number of vast structures like the Coliseum or the profusion of triumphal arches, formal fountains dedicated to this or that dignitary, and monumental sculptures. The city is thick with the ancient Romans' desire to memorialize the great, and with the fruits of the *technical* know-how--sculptural, architectonic, and landscape sensitive--which was necessary to create this testimonial to the past.

Readings

White, K.D., *Greek and Roman Technology*, Ithaca, 1984.

Derry, Thomas K., Williams, Trevor I, *A Short History of Technology: From the Earliest Times to A. D. 1900.*, New York, 1993.

Discussion questions

Roman technology was advanced, for the ancient world. What did Roman technology strikingly lack, in order to be where modern technology is now?

Obviously Roman technology has debts to the Greeks. What about Egypt and Mesopotamia? What does Roman technology derive from those two cultures?

The ancient Romans invented many specific labor saving and comfort enhancing devices: the screw press; double glazing for windows; the flush toilet; and even, thanks to the Alexandrian scientist Hero, a proto steam-engine device. Who were the inventors of these devices? Scholars; men of business? Ordinary citizens? Trainees in mechanical workshops?