

There is one thing most of us take for granted: central heating. It's just there, and we don't really think about it too much. The Romans, however, thought about it a lot - they invented it!

At a time when the only form of domestic heating available was either sunlight, open fire or portable brazier, the hypocaust, or central indirect heating system, was a welcome addition to any home or bath. Although restricted to the ground-floor and limited to one or two rooms except in the elaborate baths, the hypocaust system was one of many innovations of engineering in which the Romans excelled.

Wonderful as it must have seemed at the time, the hypocaust system remained a luxury of the rich and a convenience of the fortunate. The heating system was impractical, if not impossible, for use in a multi-storeyed housing block, or insula, and, in any case, the cost of the special construction and maintenance would have been prohibitive to the masses. The general populace had to content itself with merely closing the shutters of their windows to the cold and wind and hope the smoke of the braziers would not prove to be too much of a nuisance. What the hypocaust did provide from the first century B.C. onward was a way for the fortunate few to live in relative comfort whether in the cold frontiers of the northern provinces or in the mild climate of Italy itself.

As with many innovations of the ancient world, we are very fortunate to have not only literary evidence of the hypocaust system but also archaeological evidence. Traces of hypocaust systems from the simple to the elaborate are found in many settlement areas throughout the ancient Roman Empire. From Fishbourne and Verulamium in Britain to Carnuntum in Austria to Herculaneum and Pompeii in Italy, the hypocaust system was a carefully designed, ingenious and effective way to heat baths and villas, and well preserved examples of hypocausts have made it possible to reconstruct this Roman heating system. An ancient literary source has also been invaluable in our understanding and interpretation of the archaeological evidence obtained from these sites. Marcus Vitruvius Pollio, a first century B.C. architect, tells us in Book 5.X.2 of his "Ten Books on Architecture" that "pillars made of eight-inch bricks are built, and set at such a distance apart that two-foot tiles may be used to cover them." These pillars were two feet in height and supported the actual floor of the room above (see Figure 1). This floor was specially constructed of clay and stone or marble to keep out the smoke and fumes from below but still conduct the heat. The rooms were, therefore, heated indirectly with the actual emissions from the furnace fire never entering the room of the house or bath above. The heat from the fire circulated in the hypocaust space below the floor, warming the floor itself and then rising up through pipes built into the walls of the room. The walls were thereby heated and the hot air then escaped into the open air by means of vents under the eaves or on the roof.

Although not applicable to multi-storeyed buildings or even to the average house in the Empire - and, therefore, not exactly on the general public's list of home improvements - the hypocaust system was an excellent example of Roman skill and expertise in applying innovative engineering to domestic problems. This ingenuity led to improvements in plumbing and construction techniques, but, unfortunately, with the fall of the Roman Empire, the hypocaust system fell into oblivion as well. It was not until modern times that central heating - direct or indirect - came into use once more, and whenever we look at this "modern" convenience, we would do well to remember the Romans who invented it.