

# Underfloor heating - 2000 years ago

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## Felix and Regula



The saints Felix and Regula are Coptic Orthodox and Roman Catholic saints, together with their servant Exuperantius, and are the patron saints of Zürich.

Felix and Regula were siblings, and members of the Theban legion under Saint Maurice, stationed in the Valais. When the legion was to be executed in 286, they fled to Zürich, where they were caught, tried and executed. After decapitation, they miraculously stood to their feet, picked up their own heads, walked forty paces uphill, and prayed before lying down in death.



The legend cannot be traced beyond an 8th century account, according to which the story was revealed to a monk called Florentius.

The Grossmünster was built on their graves from ca. 1100, while the Wasserkirche stands at the site of their execution. From the 13th century, images of the saints were used in official seals of the city and on coins. On the saints' feast day, their relics were carried in procession between the Grossmünster and the Fraumünster, and the two monasteries vied for possession of the relics, which attracted enough pilgrims to make Zürich the most important pilgrimage site in the bishopric of Konstanz.

With the dissolution of the monasteries by Huldrych Zwingli in 1524, their possessions were confiscated and the graves of the martyrs were opened. There are conflicting versions of what happened then. Heinrich Bullinger claims that the graves were empty save for a few bone fragments, which were piously buried in the common graveyard outside the church. The Catholics, on the other hand, claimed that the reformers were planning to throw the relics of the saints into the river, and that a courageous man of Uri (who happened to be exiled from Uri, and by his action earned amnesty) stole the relics from the church and carried them to Andermatt, where the two skulls of Felix and Regula can be seen to this day, while the remaining relics were returned to Zürich in 1950, to the newly built Catholic church St. Felix und Regula. The skulls have been carbon dated, and while one dates to the Middle Ages, the other is in fact composed of fragments of two separate skulls, of which one is medieval, and the other could indeed date back to Roman times.

This legend has been so strong that Felix and Regula, with their servant Exuperantius, still appear on the coat of arms and seal of Zurich today.

## Underfloor heating – 2000 years ago

The Schipfe quarter at the Limmat river below the Lindenhof is the site of the Roman vicus, with traces of a hypocaustum excavated. Hypocausts were used for heating hot baths, houses and other buildings, whether public or private. The floor was raised above the ground by pillars, with a layer of tiles then a layer of concrete then another of tiles on top; and spaces were left inside the walls so that hot air and smoke from the furnace would pass through these enclosed areas and out of flues in the roof, thereby heating but not polluting the interior of the room. Ceramic box tiles were placed inside the walls to both remove the hot burned air, and also to heat the walls. Rooms requiring the most heat were placed closest to the furnace, whose heat could be increased by adding more wood to the fire. It was labour-intensive to run a hypocaust as it required constant attention to tend the fire, and expensive in fuel.



Zürich's Schipfe quarter

Vitruvius describes their construction and operation in his work *De architectura* in about 15 BC, adding details about how fuel could be conserved by designing the hot room or *caldarium* for men and women to be built next to one another, adjacent to the *tepidarium* so as to run the public baths efficiently. He also describes a device for adjusting the heat by a bronze ventilator in the domed ceiling.

Many remains of Roman hypocausts have survived throughout Europe, western Asia, and northern Africa. The hypocaust was an invention which greatly improved the hygiene and living conditions of citizens.

*A pity the knowledge of the Roman architects was lost for centuries through the Middle Ages and had to be reinvented, step by step, over recent centuries. Archaeology, apart from being just interesting, has very practical uses, too!*